PRE-CONVENTION ISSUE April 1942

THE FOUNDRY

FIFTIETH YEAR

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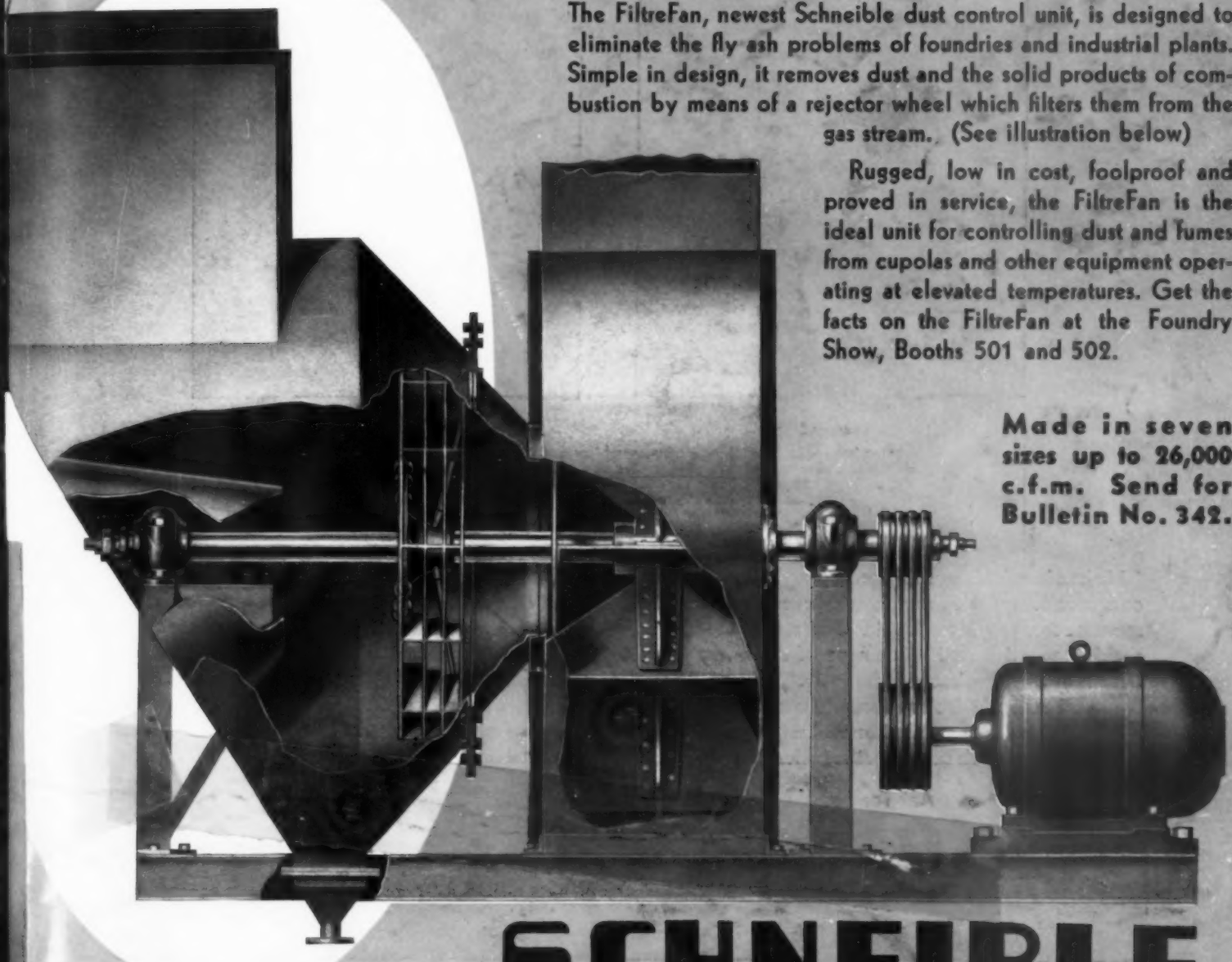
DETROIT

for Cupola and Stack Dust Control — THE FILTRE FAN

The FiltreFan, newest Schneible dust control unit, is designed to eliminate the fly ash problems of foundries and industrial plants. Simple in design, it removes dust and the solid products of combustion by means of a rejector wheel which filters them from the gas stream. (See illustration below)

Rugged, low in cost, foolproof and proved in service, the FiltreFan is the ideal unit for controlling dust and fumes from cupolas and other equipment operating at elevated temperatures. Get the facts on the FiltreFan at the Foundry Show, Booths 501 and 502.

Made in seven sizes up to 26,000 c.f.m. Send for Bulletin No. 342.



SCHNEIBLE

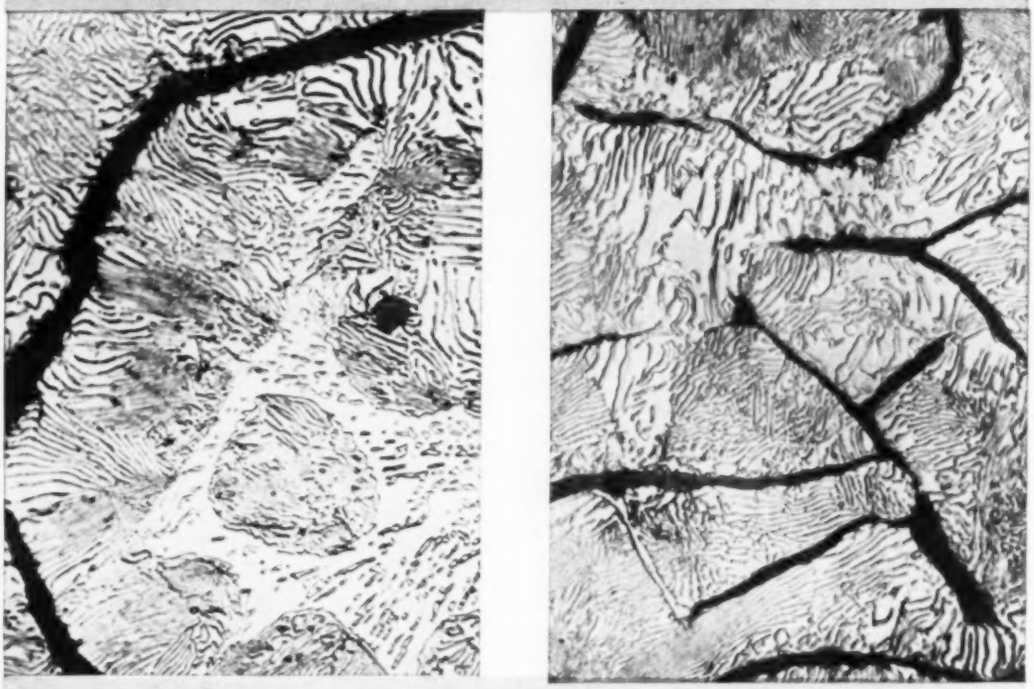
CLAUDE B. SCHNEIBLE COMPANY

3951 Lawrence Ave., Chicago

Offices in Principal Cities

Refining with PURITE *insures* CLEANER IRON AND STRONGER CASTINGS

The value of Purite in refining cupola cast iron is now generally recognized by progressive foundrymen and metallurgists everywhere. The refining is more than simply removing sulphur. Occluded gases are expelled by the boiling action set up by Purite and entrained oxide-silicates and other non-metallic impurities are washed out of the iron and carried off in the Purite slag.



Untreated — Treated

Photomicrographs of an all-scrap mixture cast iron at 1,000 X etched with 2 percent nital, before and after refining with Purite. See how Purite refining washes out manganese sulphide and complex silicate inclusions, breaks up the phosphide areas, reduces the size of graphite particles and produces a more uniform, dense structure iron.

Molten iron is always charged with gases and gaseous compounds as well as some non-metallic impurities, more or less varying with the character of the charge, melting practice and refinement of the metal in the hearth of the cupola or in the ladle. These tend to be squeezed out as the iron freezes in the mold, sometimes causing pinholes or gas pockets and segregated defects.

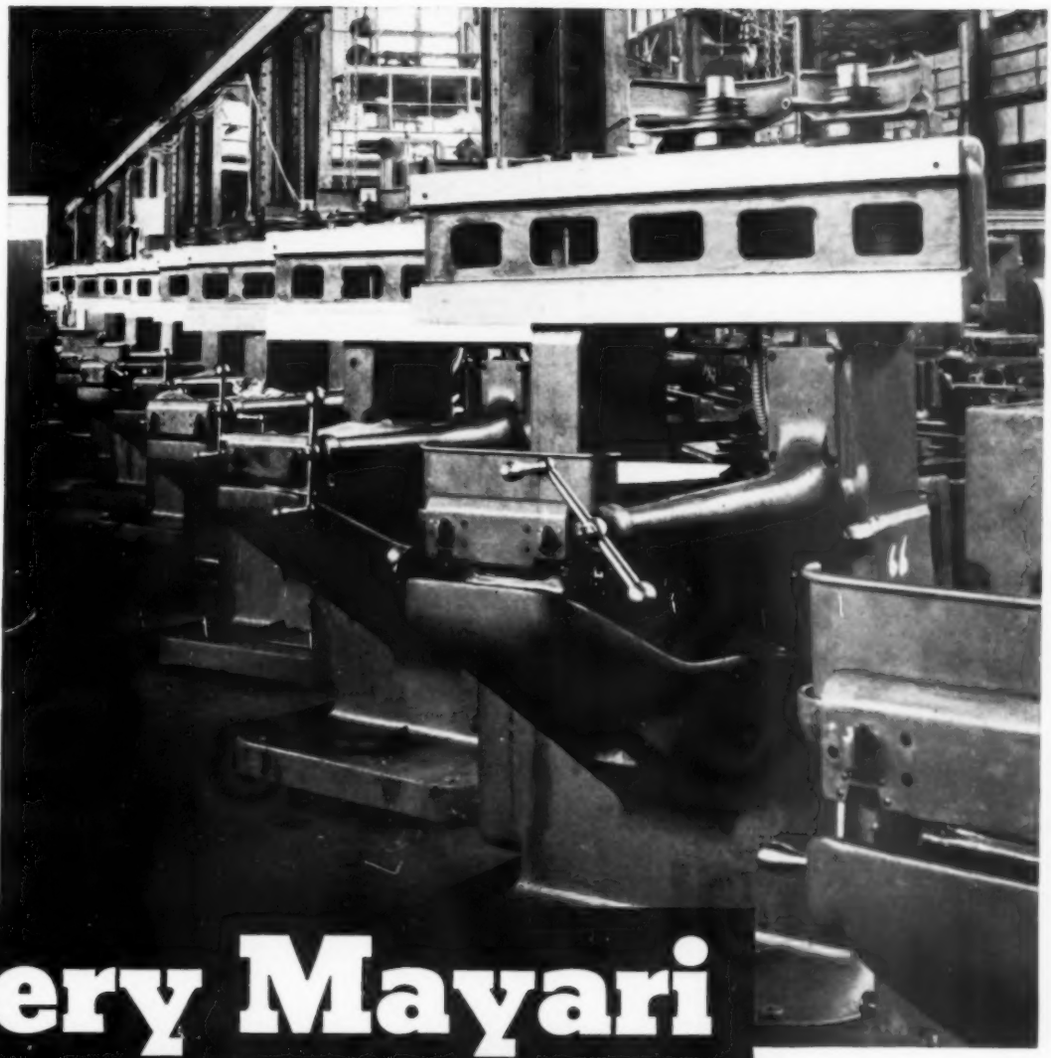
Purite reacts with non-metallic inclusions or silicates in molten cast iron, forming fluid soda slags which rise out of the iron. It combines readily with gaseous sulphur which is held in the Purite slag or is driven off, along with other gases, by the boiling action set up in the iron by Purite. Thus it is seen how refining with Purite, whether in the cupola hearth or in the ladle, increases the strength and improves the grain structure, soundness and machinability of iron castings.

Ask for new bulletin P41 "REFINING CAST IRON WITH PURITE"

THE MATHIESON ALKALI WORKS (INC.)

60 EAST 42ND STREET, NEW YORK, N. Y.

Warplane Tools



Silvery Mayari

The line-up of castings shown above are bases for double spindle milling machines known as profilers—to be used in turning out engines for warplanes.

These castings are made with a cupola mixture containing Silvery Mayari. Because it enables foundrymen to turn out castings that are sound, strong and machinable, Silvery Mayari alloy iron is being used in increasing quantities to produce war tools.

While war demands for Silvery Mayari have made inevitable a reduction in tonnages available for non-military purposes, we are still in position, as always, to offer cooperation to foundrymen in solving their problems. Next time you have a tough problem relating to alloy-iron castings, we suggest that you call in a Bethlehem foundry specialist. He may be able to help you. No obligation, of course.

BETHLEHEM STEEL COMPANY

BETHLEHEM STEEL

SUPPORTING THE MEN
Behind Our Guns!

☆ ☆ ☆

As a foundry supply company, we can't enlist in the Army or Navy; we can't shoot a gun, pilot a plane, run a boat or drive a tank—in fact there's an imposing list of things we can't do.

By the same token, however, there are lots of things we *can* do to support the men behind our guns—and we're "all out" to do every single one of them.

We can continue to furnish the best foundry supplies obtainable—to ensure the quality of American foundry products; we can ship orders promptly—to help avoid bottlenecks; we can continue our research for better products for better castings.

We *can* do these things—we *are* doing them—to support the men behind our guns.

CHARLEROI SEACOAL

Immediate war time deliveries on a uniformly good product—that's Charleroi.

A new mill, just being installed at our Charleroi plant, gives us increased capacity to guarantee immediate deliveries. You'll never wait for Charleroi Seacoal.

You'll save money with Charleroi too. It's the finest grade of coal, carefully ground and accurately screened to seven grades. The right grade of Charleroi can save up to 20% of your seacoal costs!

FEDERAL GREEN BOND

15 years of bentonite experience are behind Green Bond—the ideal sand bonding agent.

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Tremendous production capacity plus huge reserve stocks ensure prompt deliveries. Our 15 years of bentonite experience is your guarantee of quality.

When you're ready for the best in bentonites—try Federal Green Bond.

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THE FOUNDRY

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APRIL, 1942

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THE FOUNDRY is indebted to the Cleveland Convention & Visitors Bureau for the photographs of Cleveland scenes reproduced in this issue, to the U. S. Navy, U. S. Signal Corps, OEM and NEA for decorative photographs, and to Ben Strauss Studio for cooperation in preparing photographs of Cleveland committees.

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Right now—today—TIME IS PRICELESS! Yet TIME is swiftly slipping away—

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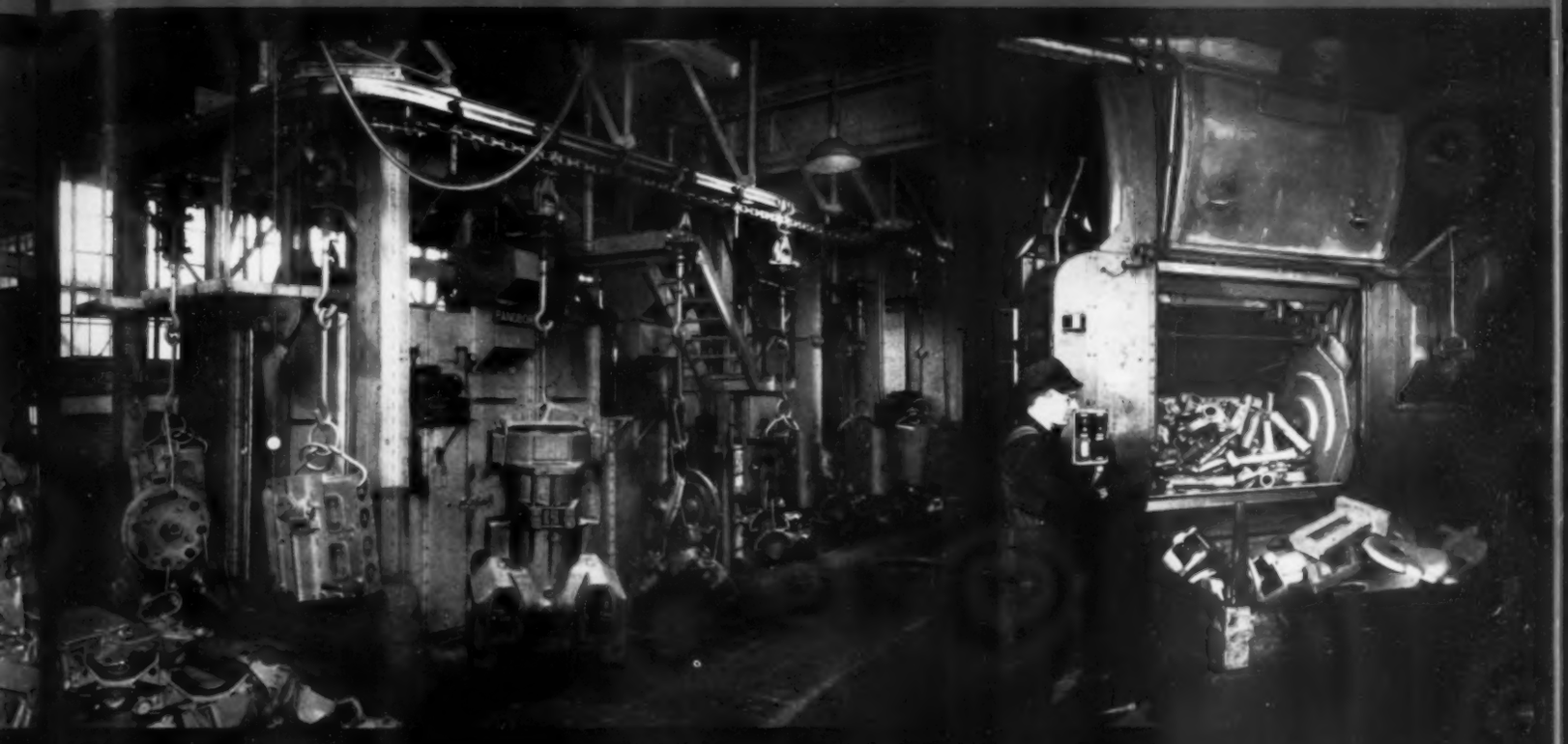

Pangborn ROTOBLAST Tables, Barrels and Special Cabinets—many operating twenty-four hours a day—are cutting blast cleaning time schedules right and left. Gray iron, steel, alloy and malleable castings; forgings; steel products including shells, bombs, armor plate, tank and gun parts are being DELIVERED—TODAY—because of Pangborn ROTOBLASTING.

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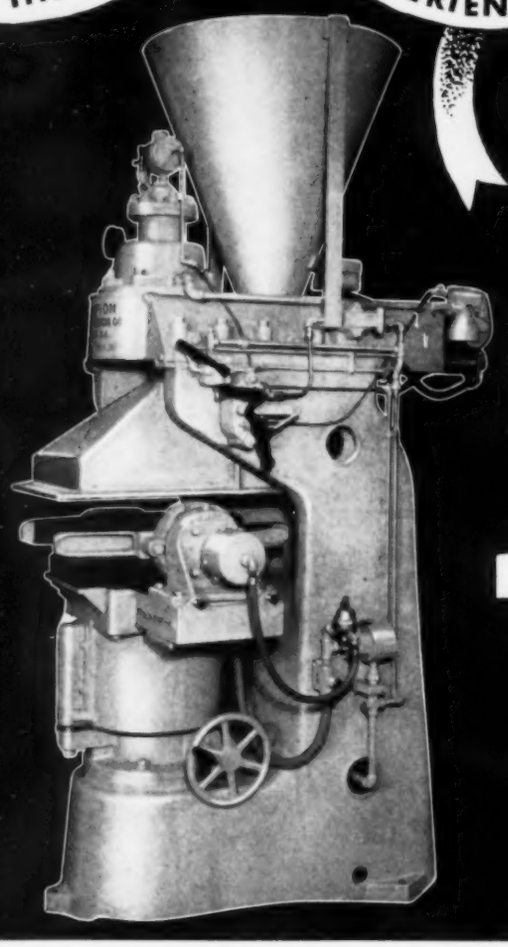
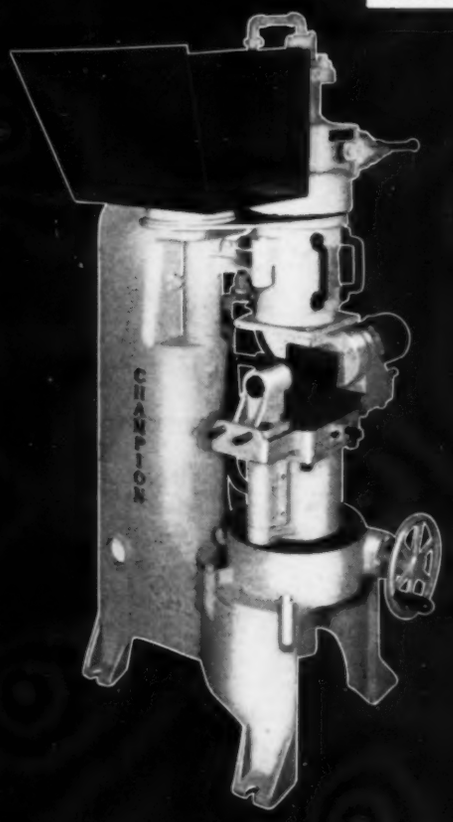


Model CB-15



Model CB-8

Why Worry About the Shortage of Skilled Labor?

Any man, woman or child can economically produce perfectly rammed cores on a *Champion Core Blower.* You merely set the box, pull the lever and in a second the core is perfectly rammed. Small or large, the ramming time is the same and *every core is rammed the same.* Unparalleled accuracy and uniformity is assured.

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CHAMPION Foundry &

Core Blowers

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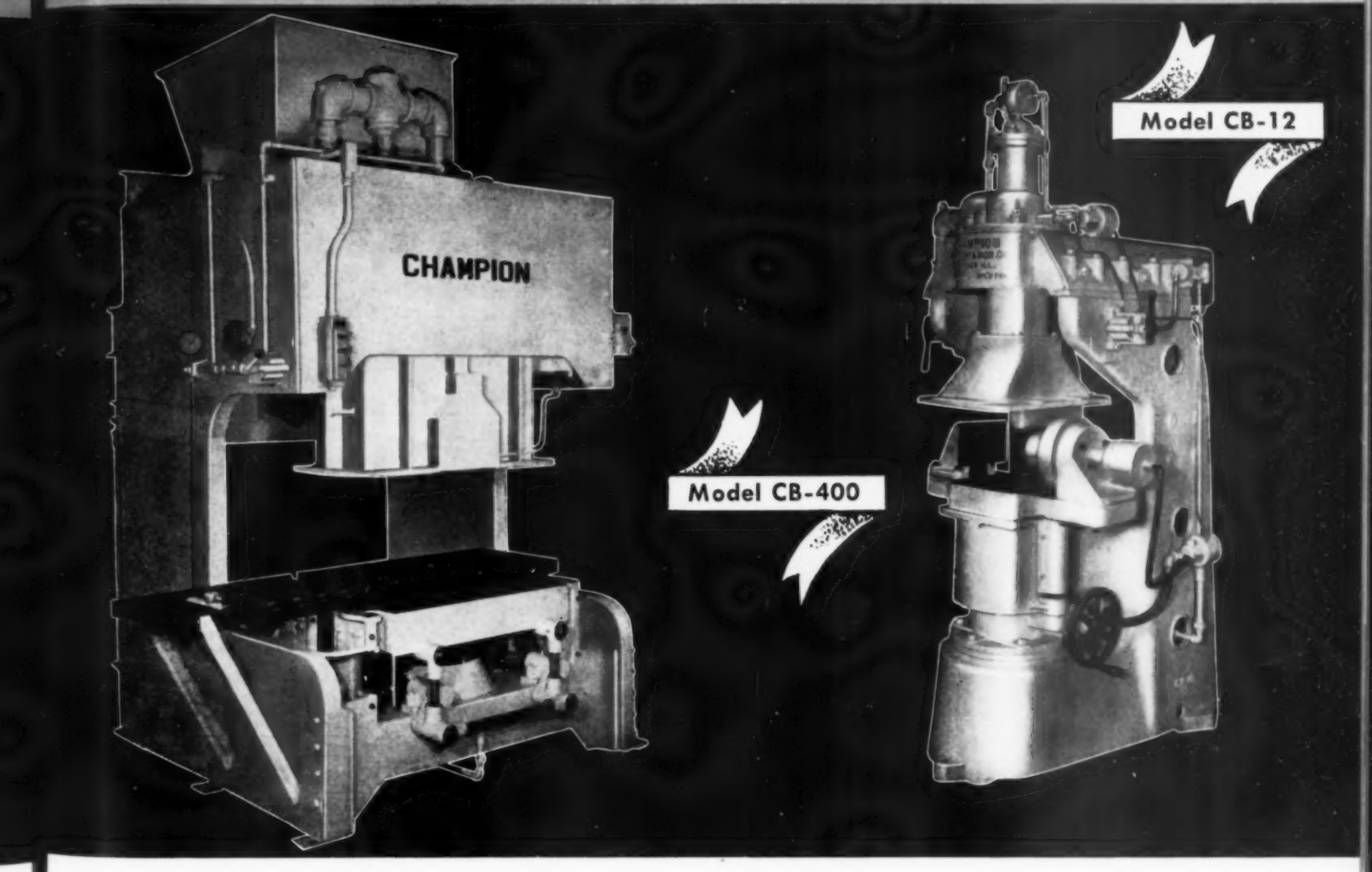


action produces 25% more blow power, decreases air leakage and prevents pressure dissipation,—some of the reasons *Champion Core Blowers* successfully produce cores that have been stumbling blocks for others.

CB-8, 10, 12 and 15 Core Blowers are furnished complete with Air Tank and either bucket loading or shovel-in sand hoppers. The CB-400 is furnished with bucket loading hopper only. No pressure booster is required as the Champion operates successfully with 80 pounds pressure, and in some cases cores have been blown with as low as 60 pounds pressure.

We'll See You at the Convention *BUT...*

Realizing the urgent and immediate need of Our Country for production equipment on War Work, we are unable to exhibit our complete line of equipment as originally planned. However, *Champion's* representatives will be in Booth No. 415, prepared to assist you with your production molding and core problems.

& Machine Co.

1318 W. 21ST STREET
CHICAGO, ILLINOIS

Bring your WAR PRODUCTION

...NATIONAL ENGINEERING COMPANY

Foundry Engineers will be glad to help you solve your problems pertaining to SAND PREPARATION . . . SAND and MOLD HANDLING . . . and SAND RECLAMATION to Assure MAXIMUM PRODUCTION and GREATER ECONOMY

★ How to increase production without running up excessive costs to meet war demands for tank armor . . . armor piercing shells . . . bomb casings . . . aluminum and magnesium castings for planes and engines . . . steel treads for tank crawlers . . . machine gun and howitzer parts . . . these are a few of the problems that confront the Foundry Industry today. How are *you* solving them?

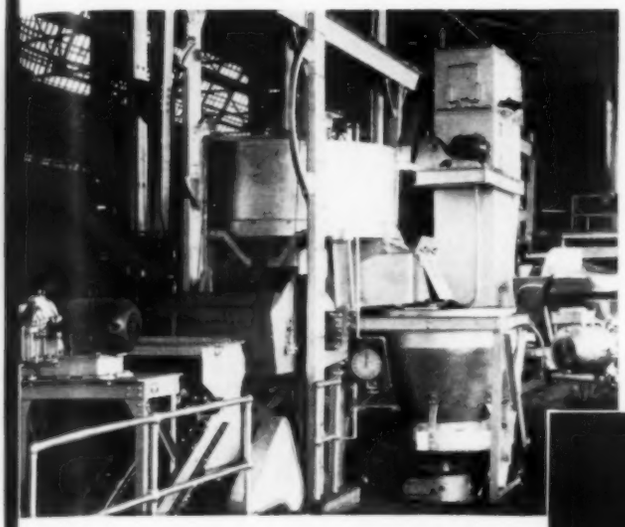
If you need help, may we suggest that you contact one of our Foundry Engineers, at Booth 342-8 in Cleveland? Perhaps we can furnish the answers to some of your most important problems. In the case of sand preparation and sand handling, we *know* we have the experience — because we have specialized in this kind of work for over 29 years.

We'll be glad to show you how the NEW Simpson Intensive Mixers and Auxiliary Equipment will help to assure the lowest cost per ton of good castings produced — plus improved quality of finished product. This applies to *any* type of foundry, on *all* classes of sand. *You get the Quality and Quantity of sand you want in the NEW SIMPSON MIXERS.*

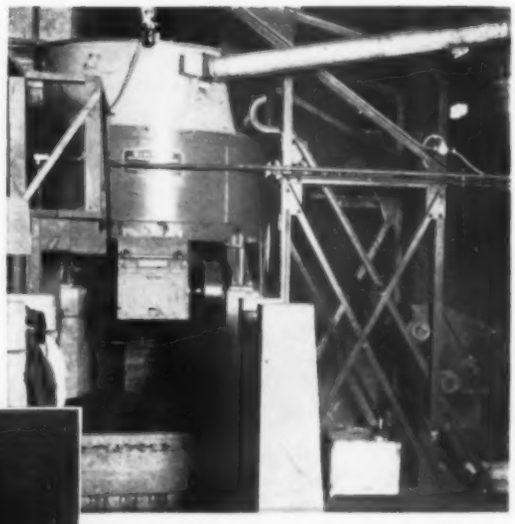
So come in and discuss your war production problems at the A. F. A. Convention. There is no obligation, of course.

MAKE BOOTHS 342-348
Your Headquarters!

problems to the A. F. A. CONVENTION



BELOW: Unit drive No. 2 Simpson Mixer and straight-lift bucket loader on MALLEABLE IRON facing sand. Loader has independent speed reducer drive and complete push-button control. Note economy of floor area and headroom with this high-duty unit.



ABOVE: View of sand reclaiming and preparing unit in GREY IRON foundry making large castings. Equipment includes No. 2 Simpson Mixer, screening and magnetic separator unit, straight-lift loader, aerator, prepared sand hopper with table feeder to elevator boot, centrifugal discharge elevator and chute feeding sand slinger.

ABOVE: Complete No. 2 Simpson Mixer unit with loader, aerator, screening and magnetic separator and exhaust equipment for removal of dust and fines, used in a STEEL foundry.

BELOW: No. 2 Simpson Mixer with overhead loader in sand system on moulding sand for miscellaneous BRASS FITTINGS.

LEFT: View of No. 1½ and No. 2 Simpson Mixers on special synthetic facing for flat plate work in a GREY IRON foundry. Thoroughly mulled, strictly uniform sand assures perfection of casting surfaces required.

SIMPSON

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NATIONAL ENGINEERING COMPANY

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DIAMOND BLAST SAND
FLINT SHOT BLAST SAND
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CRUDE SILICA SANDS (Steel)
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• PRODUCTS •

PRODUCTS—Great Lakes has pioneered the mining and use of new sands and materials due to having a thorough knowledge of the requirements of all types of foundries—better to enable them to produce improved castings at lower cost.

SERVICE—For twenty-three years Great Lakes has given their customers throughout the United States and Canada a specialized service.

• • Great Lakes Foundry

See Us at A. F. A.

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the Foundry Industry

LAKES

•SERVICE•

We refer to our laboratory staff and foundry engineers—all specialists in their line—well qualified by experience to recommend approved materials and methods for molding, coremaking, melting and cleaning. They supplement the work of our sales force, the members of which were for years foundry executives.

We know of no better way of expressing our appreciation for the business placed with us.

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1140

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POURING lines of Logan Heavy Duty Roller Conveyor in this up-to-date steel foundry are part of a comprehensive handling system

The Sign-Off for Adolf!

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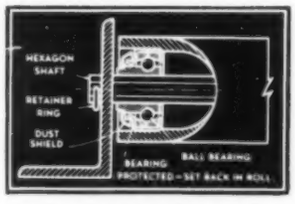

Logan Rolls combine ruggedness with simplicity.

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Logan Conveyors

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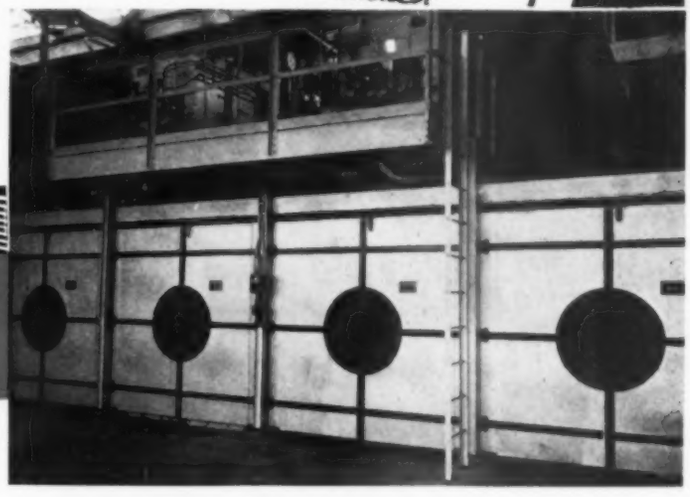

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Learn how to speed production of essential castings for the War Effort.

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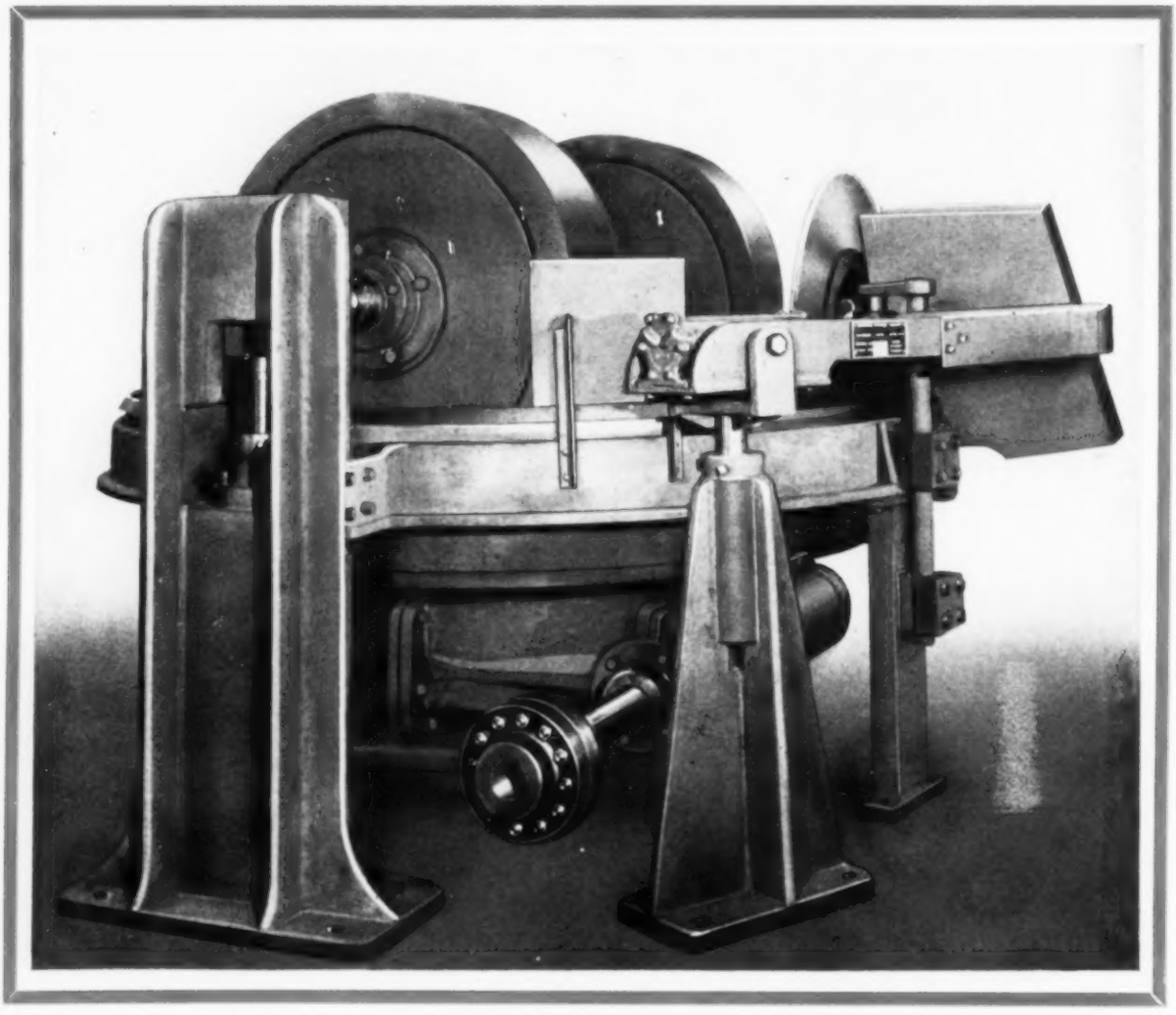

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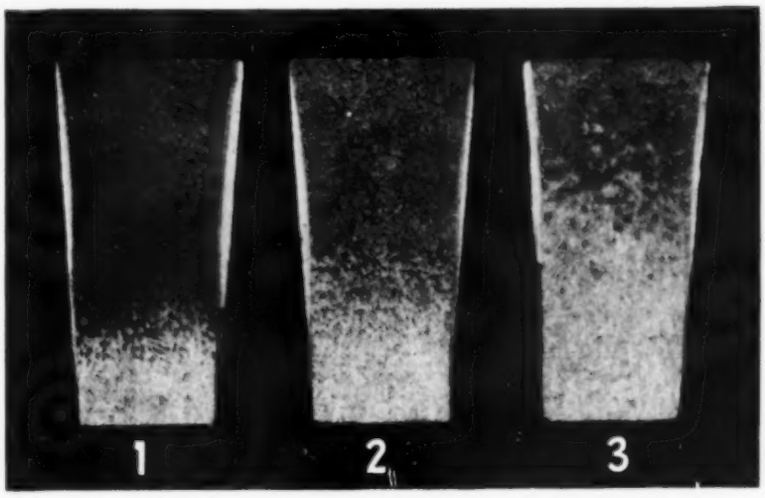
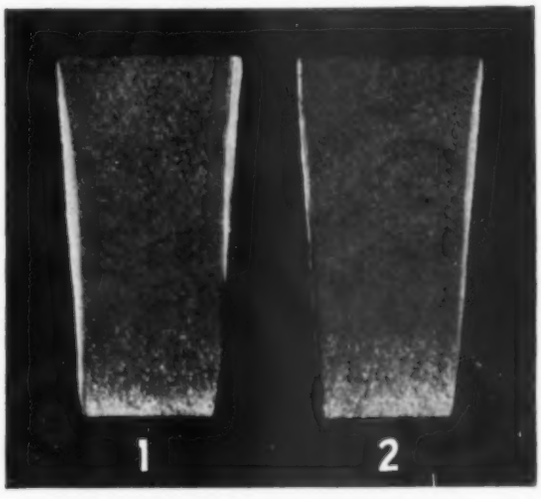
How You Can Help to Conserve Chromium

by Using S.M. Ferrochrome



Chill bars of a hard base iron, showing the effect of adding 0.50 per cent chromium in the ladle. **1.** *No chromium added.* **2.** *Chromium added as Foundry Grade Ferrochrome.* **3.** *Chromium added as S.M. Ferrochrome. Observe that the latter produces a considerably greater increase in the depth of chill, showing that less of this alloy is needed.*



Chill bars of a soft base iron, showing the effect of adding 0.50 per cent chromium in the ladle. **1.** *Chromium added as Foundry Grade Ferrochrome.* **2.** *Chromium added as S.M. Ferrochrome. The latter again produces a deeper chill.*

WHEN you use S.M. Ferrochrome to add chromium to cast iron in the ladle, you don't need to add as much chromium to obtain a desired increase in chill as with other chromium alloys. S.M. Ferrochrome dissolves more readily in the molten metal and results in a higher recovery of chromium and a greater increase in the depth of chill per unit of chromium added. Thus the use of this recently developed alloy helps to conserve chromium, a strategic material.

Because S.M. Ferrochrome dissolves rapidly in the molten metal, it results in uniform distribution of the chromium and thus prevents the formation of hard spots in the iron caused by incomplete solution. Also, the use of this alloy permits the satisfactory ladle addition of larger amounts of chromium with recoveries of 90 per cent or more.

The addition of chromium to cast iron improves its wear resistance, minimizes growth at high temperatures, increases its resistance to heat, and improves its physical properties. With S.M. Ferrochrome, these extra qualities can be quickly and easily imparted to cast iron in the ladle.

One of our metallurgists will gladly call and explain further how you can help to conserve chromium by using S.M. Ferrochrome for making ladle additions to cast iron. He can tell you also about other "Electromet" ferro-alloys for the cast iron foundry and can give you practical help in their efficient use to obtain quality iron at low cost. This service is yours for the asking.

ELECTRO METALLURGICAL COMPANY
Unit of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York, N. Y.

The word "Electromet" is a registered trade-mark of Electro Metallurgical Company.

"Electromet" Ferro-Alloys and Metals are available through offices of Electro Metallurgical Sales Corporation in Birmingham, Chicago, Cleveland, Detroit, New York, Pittsburgh, and San Francisco. In Canada: Electro Metallurgical Company of Canada, Limited, Welland, Ontario.

Electromet
Trade-Mark
Ferro-Alloys & Metals

. . . IN THE WARTIME LIFE OF A FOUNDRY

SHOT **GRIT**

The finished armaments for war requirements depend greatly upon the products of the foundry with Globe "H-C" Chilled Shot and Globe Cornered Steel Grit playing an all important part as the steel abrasive for air and airless cleaning of all types of armament parts.

In the pellmell rush of today's foundry cleaning rooms the highest quality of Shot and Grit are essential. Rigid specifications require the best castings the foundry industry can produce, this in turn requires the most exacting cleaning.

LET US KNOW YOUR REQUIREMENTS . . . . our production is geared to the ever increasing tempo of more and more production . . . and Globe backed by experience since 1907 is anxious to serve you now.

See us at the Convention—Booths 325-327

THE GLOBE STEEL ABRASIVE CO.
MANSFIELD, OHIO

THE TABOR MANUFACTURING CO.

FOUNDRY MOLDING MACHINES
FOUNDRY EQUIPMENT . . . . .

6225 TACONY STREET
PHILADELPHIA • PA.

TABOR
TRADE MARK

April 20th–24th
1942

Re: The A.F.A. Convention, at the Auditorium,
Cleveland, Ohio

We'll Be There!

...We believe that this forthcoming get-together of foundrymen will prove helpful and valuable to us all in the work that lies ahead...and we welcome another opportunity of meeting with friends old and new.

Sincerely yours,

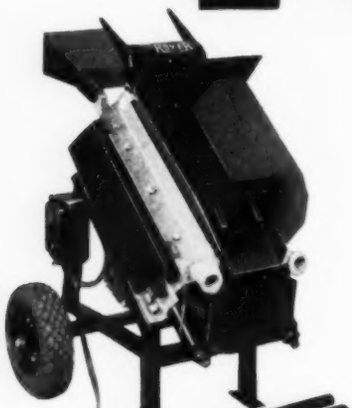
THE TABOR MANUFACTURING COMPANY

ABRASIVE CUTOFF MACHINES • CUPOLAS • LADLES • SAND BLAST MACHINES • TUMBLING BARRELS
DUST COLLECTORS • MOLDING MACHINES OF ALL TYPES AND SIZES

P.S. Be sure to look us up...at Booth 330, in Cleveland!

ROYER Sand

The Royer, Jr. for small grey iron foundries and non-ferrous shops—2 to 5 tons per hr.



Model "NB-2" for small jobbing shops—7½ to 10 tons per hr.

Model "NDP" for medium to large size foundries—20 to 30 tons per hr.

Model "NDS" for sand systems in production foundries—20 to 30 tons per hr.

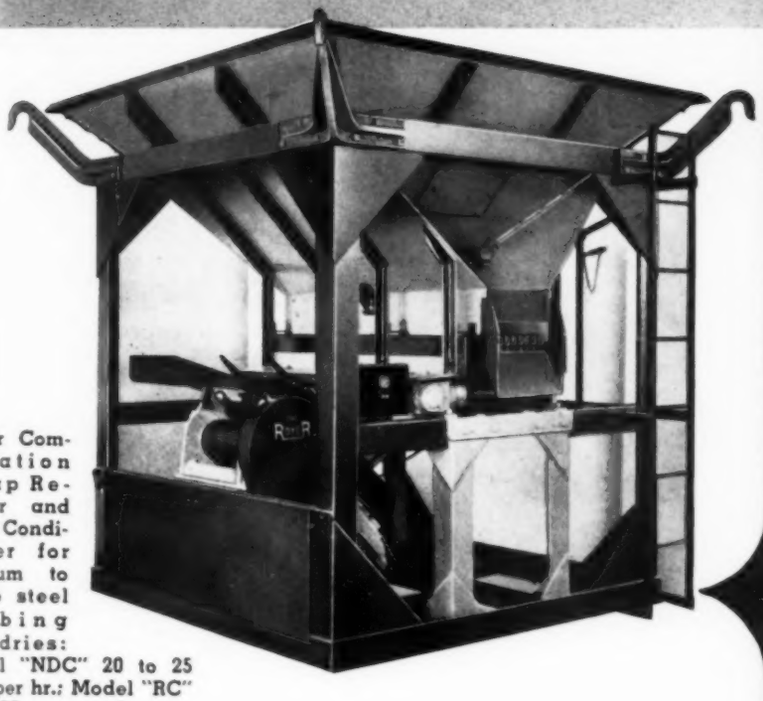
Model "NRS" for large production foundries —40 to 50 tons per hr.

Model "R" for sand systems where drive shaft or other power is available—40 to 50 tons per hr.

for greater war production....

ROYER FOUNDRY & MACHINE CO. *KINGSTON, PA*

Conditioners



Royer Combination Scrap Remover and Sand Conditioner for medium to large steel jobbing foundries: Model "NDC" 20 to 25 tons per hr.; Model "RC" 40 to 50 tons per hr.

More and better castings are needed now to meet the insistent demands of a greatly increased war production program! Planes—ships—tanks—guns.

Let one of the eight models of Royer Sand Conditioners or Combination Sand Blenders and Scrap Removers help you eliminate discounts and increase your casting production with better prepared sand.

Proper six point sand preparation is assured only by Royers.

Thorough refuse removal
Positive lump breaking
Complete blending and mixing
Distributes moisture evenly
Increases permeability
Double aerates — once on the belt and once as it is being discharged

Let us give you full details on operating economies and delivery dates on your priority requirements.

Be sure to see us at Booths 363 and 365 at the Foundry Show.

at Booths 363 and 365

THE ROYER

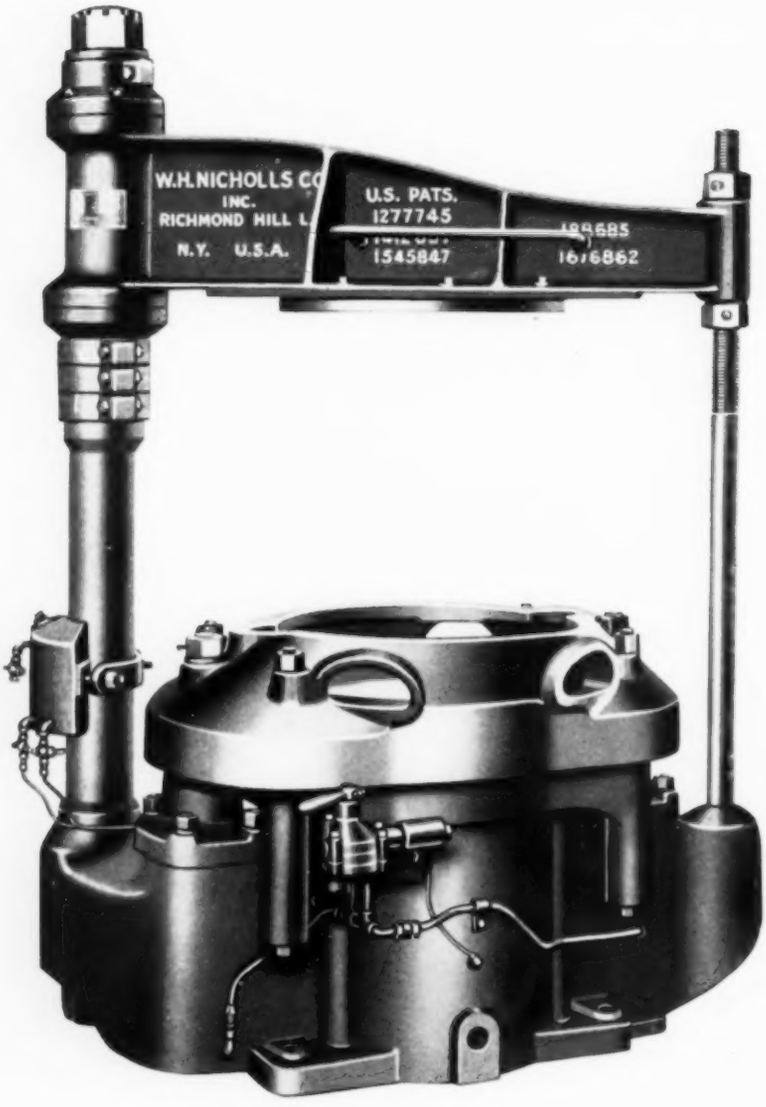
Courtesy Vultee Aircraft, Inc.

Official U. S. Army Photograph

Official U. S. Navy Photograph

Photo by U. S. Army Signal Corps.

A New...NICHOLLS MOLDING MACHINE



FASTEST MOLDING

LOWEST MAINTENANCE

...OVER A PERIOD OF MANY YEARS!

Redesigned to a minimum of working parts, thereby greatly reducing maintenance cost and at the same time lowering operating costs through saving of labor.

Illustrated is No. 16 — 36 Type D C Heavy Duty, Jolt Squeeze, Pattern Draw Nicholls Molding Machine designed for high production on an important defense job.

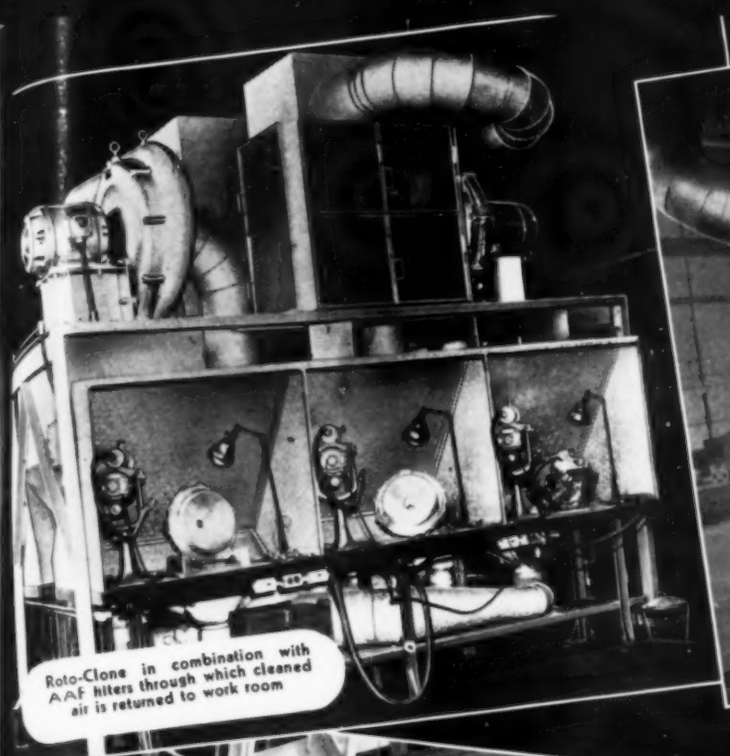
Send us data and sketches of your patterns and state number of molds required per day from each pattern. We will make recommendations without any obligation to you.

Wm. H. NICHOLLS Co., Inc.
RICHMOND HILL, LONG ISLAND, NEW YORK

Established 1910

Foreign Manufacturers and Selling Agents—
For Continental Europe and Great Britain—The George Fischer Steel and Iron Works, Schaffhausen, Switzerland

NICHOLLS



Roto-Clone in combination with AAF filters through which cleaned air is returned to work room

Type W Roto-Clone dust control for large steel shot blast room.

Necessity put ROTO-CLONE on the Priority List

Hundreds of foundries throughout the nation, geared to war production, have recognized the advantages which Roto-Clone offers in the control of foundry dusts. Roto-Clone's compact design and adaptability to overhead installation are features of outstanding importance under the present over-taxed production conditions which demand the utilization of every inch of floor space;

Bulletins describing the operation of the Roto-Clone and its application to all foundry dust problems will be sent without obligation.

SEE ROTO-CLONE AT THE SHOW

Type W Roto-Clone exhausting cleaning benches where magnesium castings are finished.

Booths 303-305

This Type W Roto-Clone exhausts tumbling barrels at night, sand blast room during day.

Roto-Clone grinding bench with Airmat P-L after cleaner for finishing airplane propellers.

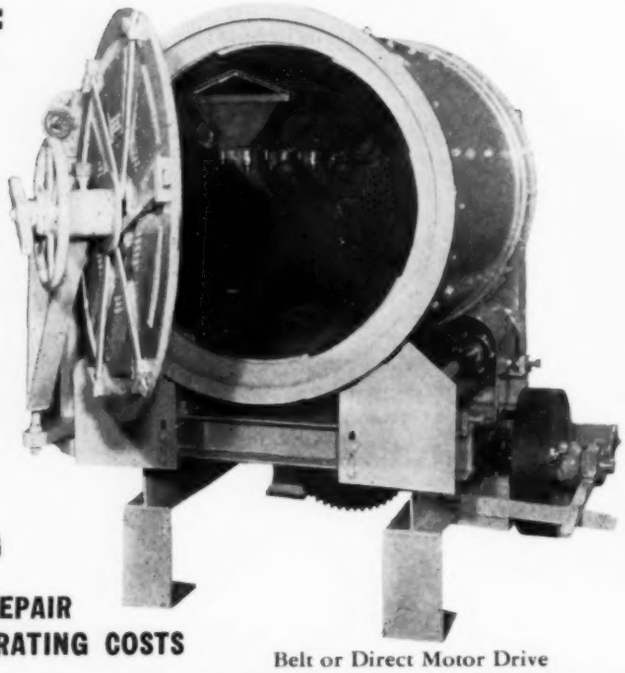
AMERICAN AIR FILTER COMPANY, INC., 266 CENTRAL AVE, LOUISVILLE, KY

INCORPORATED

IN CANADA, DARLING BROTHERS, LIMITED, MONTREAL, P. Q.

DO THE JOB WITH PRODUCTION MACHINES

NOTE:
NEW
DESIGN
—
FASTER CLEANING
—
LOWER REPAIR AND OPERATING COSTS

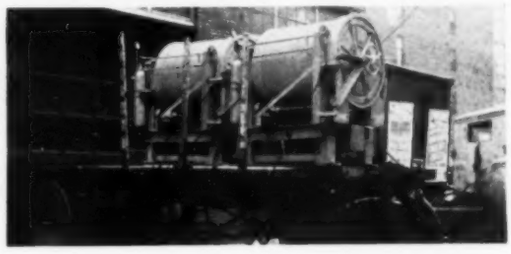


Belt or Direct Motor Drive

That have been designed for and proven by many years of service.

CONTROLLED AIR BLAST

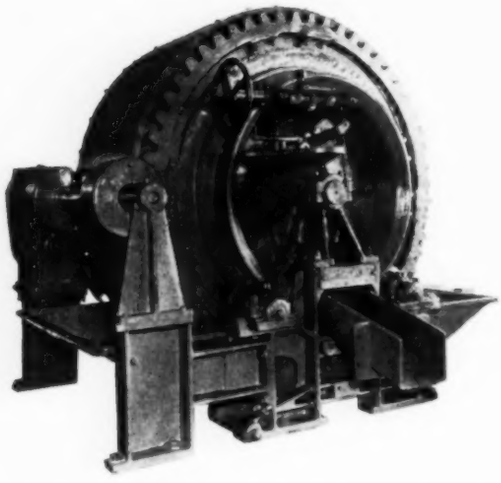
with Sand—Grit or Shot
for cleaning castings, stampings, heat treated articles and springs.
Complete unit—Abrasive automatically returned to nozzles, all within the barrel.
Cleaning time—10 to 20 minutes.
Charge—Up to 1000 lbs.



Shipping for War Production

95% WELDED STEEL CONSTRUCTION—WITH NEW FEATURE FOR REMOVING ALL THE DUST FROM ABRASIVE AND BARREL. WRITE FOR BULLETIN "SW".

RECLAIM 99½% CLEAN-REMELTING METAL
FROM ALL NON-FERROUS SKIMMINGS



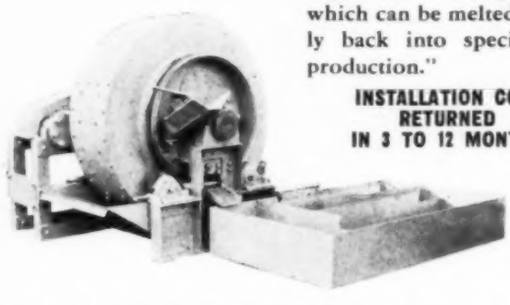
Rate of Feed—3000 to 6000 pounds per hour No. 6 size Mill—settling tanks with automatic Sludge Ejector, not shown.

COMPLETE GRINDING AND CONCENTRATING UNIT

A very exacting user's statement:

"We have found that by keeping these types of dross separate and remelting the metallic content after processing in your mill, that a suitable ingot can be procured which can be melted directly back into specification production."

INSTALLATION COST RETURNED IN 3 TO 12 MONTHS



Rate of Feed—800 to 1200 pounds per hour. No. 4 size Mill—complete with settling tank. Also No. 5 size—not shown

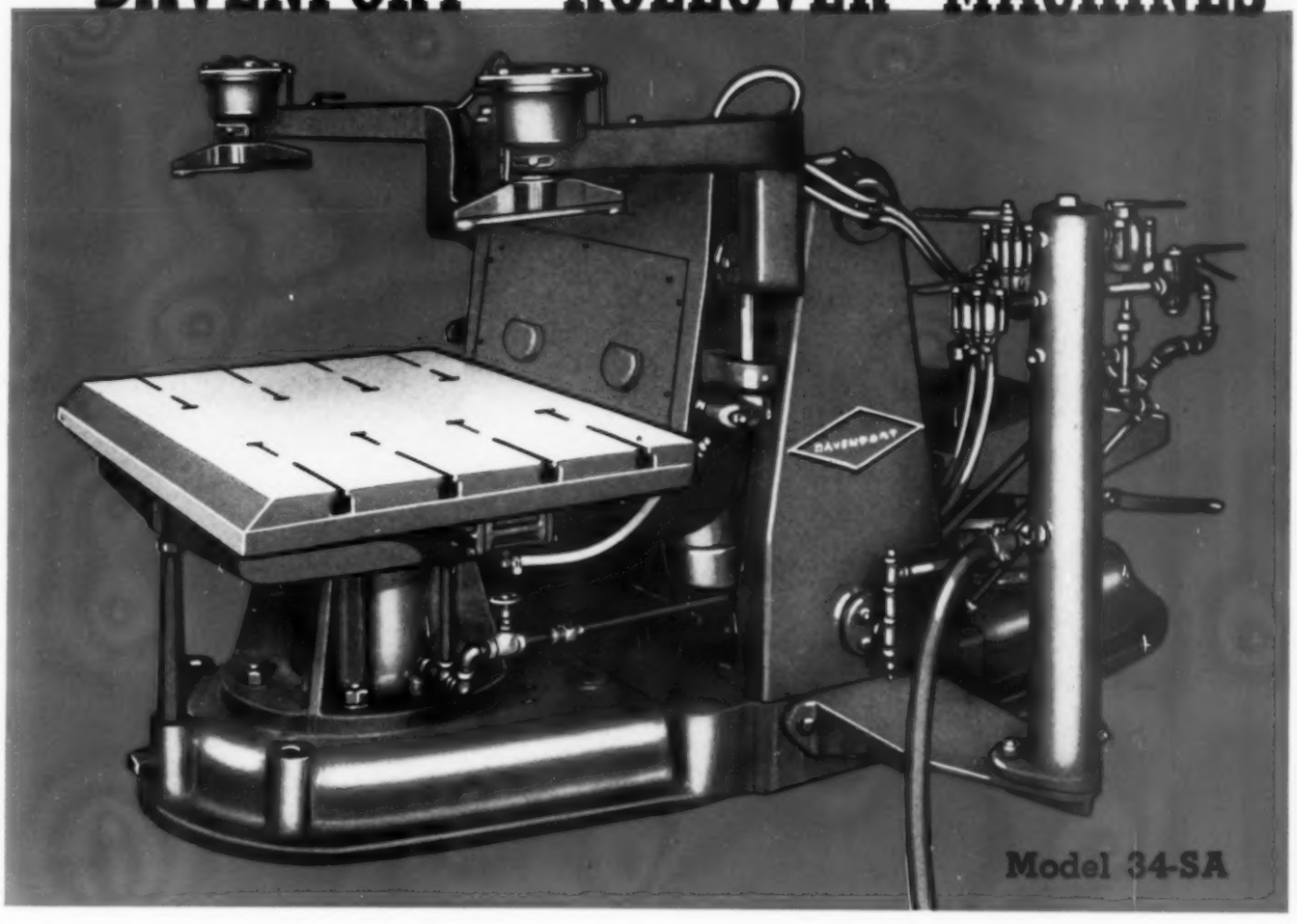
WAR DEMANDS PRODUCTION WITH EVERY POUND OF METAL

TOTAL RECLAIMING COSTS FROM 1/10 TO 1/4 CENT PER POUND. MOST EFFECTIVE AND LOWEST MILLING COSTS WITH MANGANESE STEEL CRUSHING ROLLS WITH FLEXIBLE MOUNTING TO PASS MILL FEED SIZE PIECES. WRITE FOR BULLETIN "M".

DREISBACH ENGINEERING CORPORATION

527 FIFTH AVE., NEW YORK, N. Y. **45 WARBURTON AVE., YONKERS, N. Y.**

The STEADY DRAW of "DAVENPORT" ROLLOVER MACHINES



Assures You Accurate Castings

"DAVENPORT"
Line of Molding Machines

★ **JOLT ROLLOVER DRAW MACHINE**
Model SA (Seven sizes)
Capacity from 750 to 12,000 lbs.
Model A (Six sizes)
Capacity from 1,000 to 12,000 lbs.

★ **JOLT STRIPPER OR PUSH-OFF MACHINES WITH ADJUSTABLE LIFT PINS**
Six sizes.
Capacity from 1,000 to 10,000 lbs.

★ **PLAIN JOLT MACHINES**
Fourteen sizes.
Capacity from 200 to 25,000 lbs.

A STEADY DRAW in the operating of a rollover molding machine is of utmost importance to assure accurate casting results.

The "DAVENPORT" Rollover draw is hydraulically operated, which assures a smooth steady draw. Provision is made for a slow or fast draw. The draw piston guide rods and all working parts of the draw as well as the air operated equalizer or receiving table are totally enclosed which provides protection and eliminates sand and dirt interference.

"DAVENPORT" Rollover Molding Machines are establishing new records in war production. They are compact, sturdy, easy to install (no pits necessary) and operate. Scientific construction, accurate machined parts, removable bushings, conveniently located pressure grease fittings, carefully concealed air lines, and precision balancing are all combined to make "DAVENPORT" Rollover Molding Machines a judicious buy today.

Write for our NEW catalog.

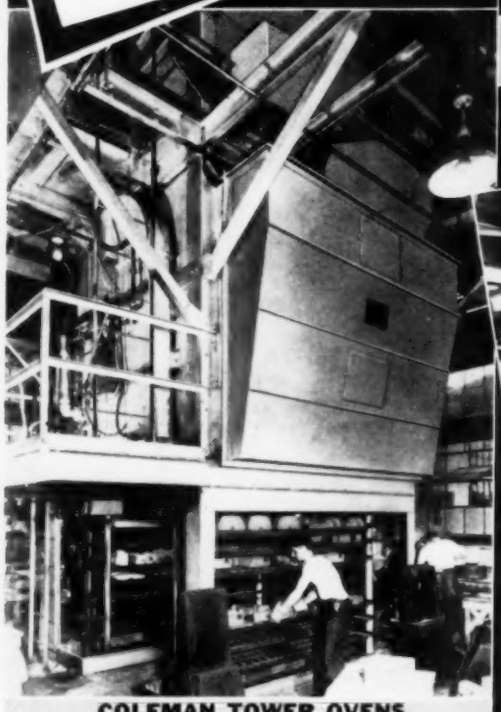
DAVENPORT MACHINE & FOUNDRY COMPANY

DAVENPORT, IOWA, U. S. A.

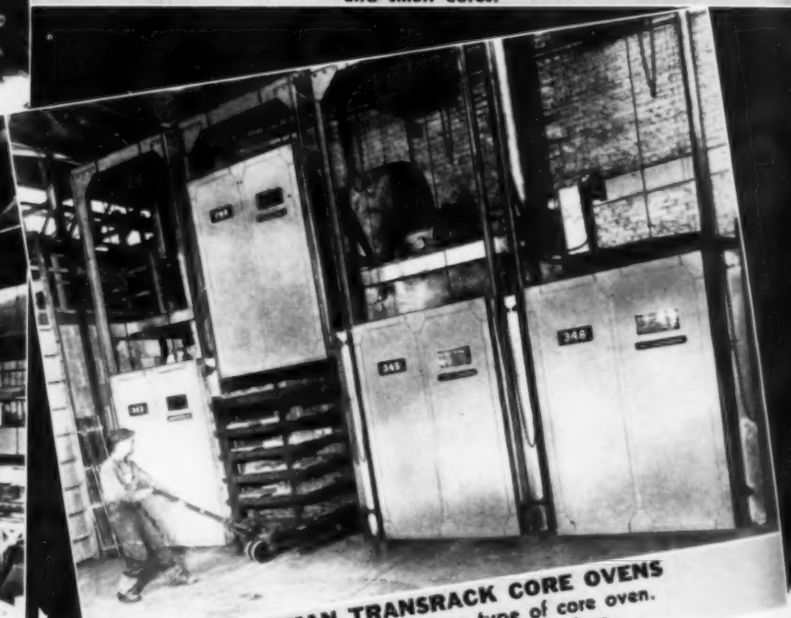
COLEMAN OVENS for...

Over 6,000 Installations

COLEMAN ROLLING DRAWER CORE OVENS
Wide range of sizes for high speed baking of medium and small cores.



COLEMAN TOWER OVENS
Amazing production with these high-speed continuous ovens.



COLEMAN TRANSRACK CORE OVENS
Most popular all-purpose type of core oven. Wide range of standard sizes.

Coleman CORE a

. . Speed and More Speed!

The foundry industry is doing a valiant job in producing more castings for more ships, more machine tools, more planes, more guns and more of everything for which castings are needed to help our armed forces speed the day of victory!

We are proud of the important part that Coleman Ovens are taking in this all-out speed program. In every class of foundry work Coleman Ovens are turning out more and better baked cores and perfectly dried molds in this battle of production.

THE FOUNDRY EQUIPMENT CO.
BUILDERS OF COLEMAN AND SWARTWOUT OVENS
CONTRACTING ENGINEERS AND MANUFACTURERS
CLEVELAND, OHIO

COLEMAN CAR TYPE MOLD OVENS
Built in all sizes to handle all "dry sand" requirements.

COLEMAN CAR TYPE CORE OVENS
For all classes of heavy and medium cores.

123

and MOLD OVENS

NORTH AMERICAN
COMBUSTION EQUIPMENT

WE DO NOT
★ **BUILD** ★
FURNACES

WHEN ORDERING FROM YOUR **FURNACE BUILDER** INSIST ON NORTH AMERICAN COMBUSTION EQUIPMENT.
YOUR LOCAL NORTH AMERICAN ENGINEER,
WILL BE GLAD TO GIVE YOU THE BENEFIT OF OUR LONG EXPERIENCE.

THE NORTH AMERICAN MANUFACTURING COMPANY
BRANCH OFFICES WITH FACTORY TRAINED ENGINEERS IN PRINCIPAL CITIES
CLEVELAND, OHIO

POUR YOUR *Molding Problems* RIGHT INTO THE LAPS OF MILWAUKEE FOUNDRY EQUIPMENT

* *Engineers*

* EXPERIENCED IN *Speeding* DEFENSE PRODUCTION!

MILWAUKEE FOUNDRY EQUIPMENT COMPANY

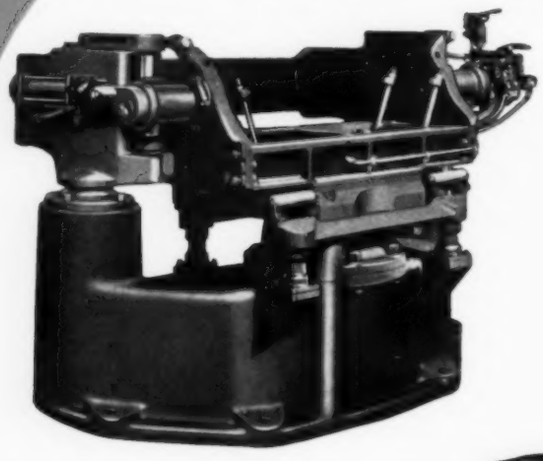
VISIT OUR BOOTH AT

Let's Get Together for a LITTLE CHAT!

You no doubt have many problems in molding and core making that could be solved if the right type of equipment were used. It is possible our present machines would be entirely adequate. Or, perhaps, a new type of equipment, or a modification of existing machines, is the answer. In any event, we suggest you throw your particular problem into the laps of our engineers. They'll be glad to give you their recommendations.

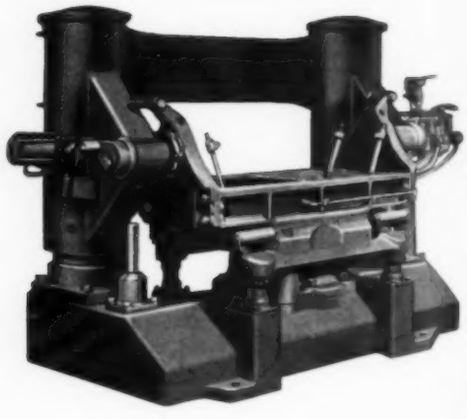
The personnel of Milwaukee Foundry Equipment Co., both engineering and sales departments, is composed of practical, seasoned foundrymen, familiar with all phases of the industry — pattern making — foundry engineering—foundry operation, etc. This broad experience enables our men to intelligently study your molding and core making problems, and arrive at a solution that is both practical and economical.

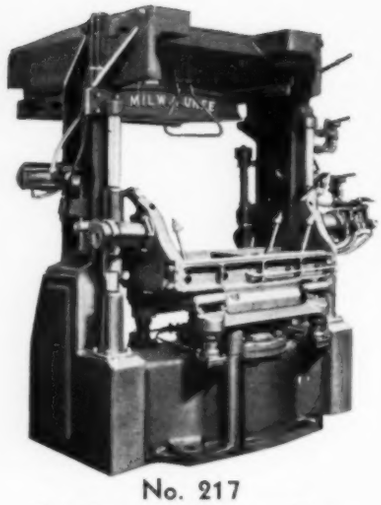
Call in a **MILWAUKEE FOUNDRY EQUIPMENT** *Engineer*



No. 40 Series
Jolt Rollover Draw

Compact, high-speed molding machine with automatic adjustable air clamps, power rollover, quick-acting pistons and instantaneous hydraulic levelling. Available with or without jolt. Illustration at left shows machine with draw pistons BELOW floor line. Machine illustrated below has draw pistons ABOVE floor line.



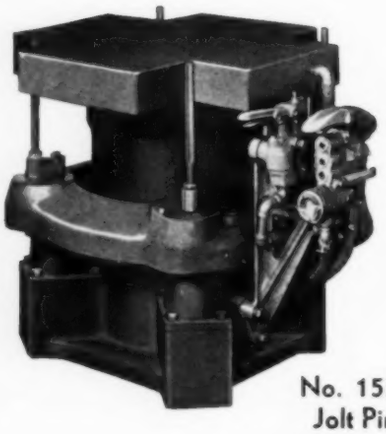


No. 217
Jolt Squeeze Rollover Draw

Power Rollover, Hydraulic Levelling, Mold Roll-out. Made in Several Sizes.

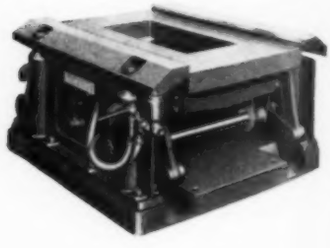
Plain Jolt

Made in All Sizes.



No. 1536 PL
Jolt Pin Lift

Hydraulic Slow Draw. Made in Several Sizes.



Power Draw

13" Draw. 27" Height. Made in Several Sizes.

MILWAUKEE

3238 WEST PIERCE STREET

VISIT OUR BOOTH AT

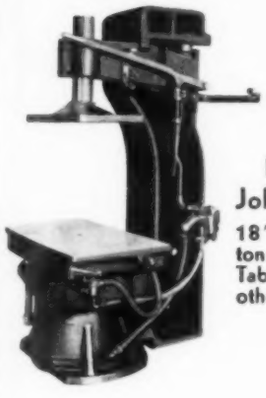
THE FOUNDRY SHOW!

No. 103
Jolt Squeezer
10" Squeeze Piston.
17" x 21" Table.

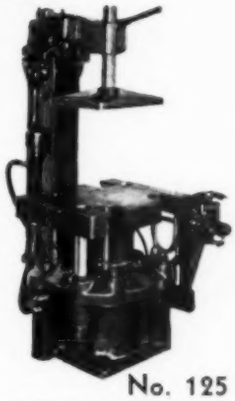
No. 123
Jolt Squeezer
12" Squeeze Piston.
17" x 26" Table.

No. 104
Jolt Squeezer
10" Squeeze Piston. 17" x 21" Table.

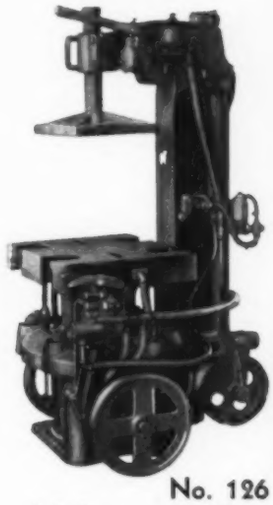
No. 124
Jolt Squeezer
12" Squeeze Piston. 17" x 26" Table.



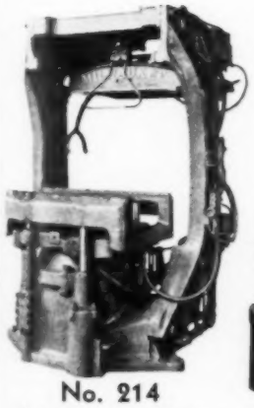
No. 181
Jolt Squeezer
18" Squeeze Piston. 24" x 36" Table. Made in other sizes.



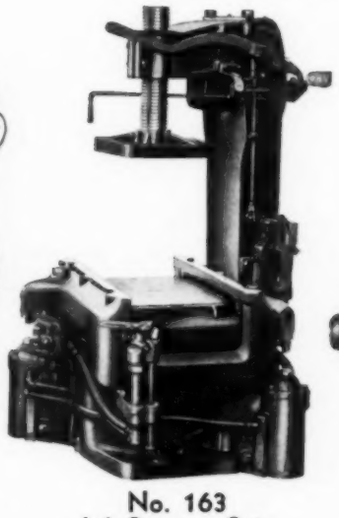
No. 125
Jolt Squeeze Pin Strip
12" Squeeze Piston. 8" Draw.
Made in Other Sizes.



No. 126
Jolt Squeeze Pin Strip
12" Squeeze Piston. 8" Draw. Made in other Sizes.



No. 214
Jolt Squeeze Strip
Equipped with Mold Lift-off. Made in several Sizes.



No. 163
Jolt Squeeze Strip
16" Squeeze Piston. 16" Opening. Made in Other Sizes.

No. 70 Core Grinder
70" Table. 30" Wheel.

FOUNDRY EQUIPMENT CO.

MILWAUKEE, WISCONSIN, U. S. A.

THE FOUNDRY SHOW!

Here's the COMPLETE LINE *of* MILWAUKEE MOLDERS..

Illustrated on these pages you will find the complete line of Milwaukee Molding Machines—the direct result of our engineers' experience gained by close cooperation in the field. There's a model to meet every molding requirement and the machines are engineered to keep pace with the present-day demand for more quality and speed. They produce uniform, accurate molds on a fast, continuous production basis, with maintenance costs reduced to a minimum.

Note the rugged, enduring construction. Designed with the fewest number of working parts, all fully enclosed, Milwaukee Molders are built to take hard, everyday punishment. Steel castings and alloy steels are used where stress is applied. Close grained, high-tensile grey iron is used wherever wear occurs. Instead of links and levers, rigid integral members are employed for alignment. Hardened pins and bushings serve as guides. Correct lubrication is provided. All parts are accurately machined to close tolerances. Adjustments are very accessible and easy to make.

Discuss these Features with a MILWAUKEE FOUNDRY EQUIPMENT *Engineer*

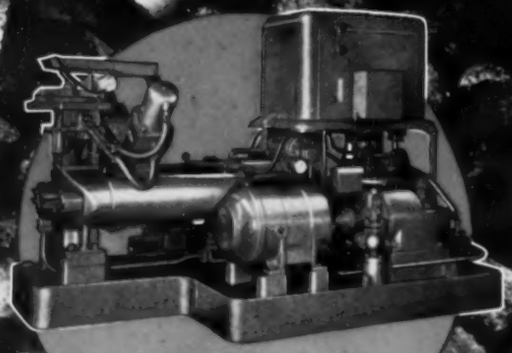
Conserve National Resources!

BRIQUETTE
Borings *and* Turnings
the Modern MILWAUKEE Way

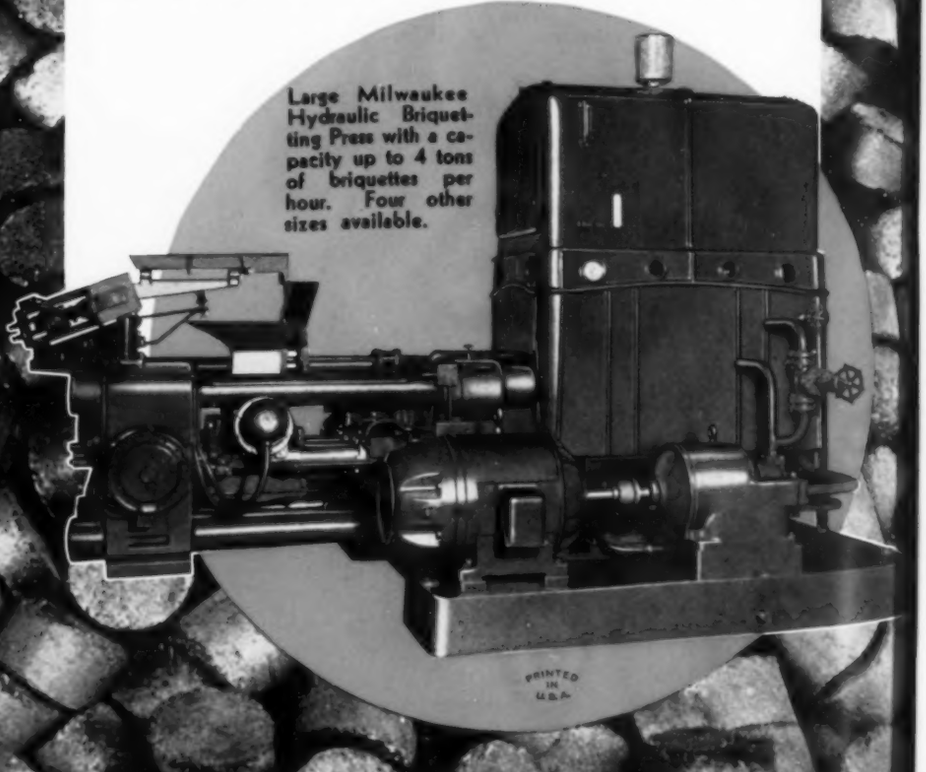
● Make up for the scrap shipped abroad by melting your borings and turnings in a briquetted form. Today — more than ever before — it's necessary to reclaim good, usable material from metal scrap. Milwaukee Hydraulic Briquetting Presses give you that opportunity. They enable you to salvage the highest percentage of materials . . . permit better metal control . . . effect substantial savings in melting costs . . . make you independent of the scrap market.

Many of the nation's leading manufacturers are now using Milwaukee Presses. By furnishing their foundry sources with briquetted borings and turnings, these plants are assured of having an adequate supply of castings. Investigate your own conditions and let our engineers help you work out an economical borings and turnings reclamation department. Write for literature.

MILWAUKEE FOUNDRY EQUIPMENT CO.
3238 W. Pierce Street **Milwaukee, Wis., U. S. A.**



Small Milwaukee Press, capacity up to 2 tons of briquettes per hour.



Large Milwaukee Hydraulic Briquetting Press with a capacity up to 4 tons of briquettes per hour. Four other sizes available.

PRINTED IN U.S.A.

VISIT Our Booth at the Foundry Show!

Here is an Elwell-Parker Charging Truck of the type first ordered by our customer. During more than 20 years since, he has added other types which co-ordinate to provide an Elwell-Parker System of Material Handling.

Writes a Foundry Executive who began buying here in 1920 and now has several types of Elwell-Parkers in operation:—

"We cannot produce on schedule the greatly-increased volume of War Business we have booked because this new business has overtaxed the capacity of our present fleet of Elwell-Parker Trucks to maintain a constant flow of castings through each step of manufacturing process.

"At least one new Elwell-Parker Truck is essential, in addition to the Elwell-Parkers we already own. With this new equipment we will not only maintain increased volume by speeding all operations, but will prolong the useful life of all our Elwell-Parkers."

●

This valued Customer has been handling and transporting Foundry loads for many years on an *increasingly* waste-reducing, low-cost basis.

His investment in each new Elwell-Parker has been made on the proven ability of that unit to handle Foundry Castings or Supplies at greater speed and volume through one or more stages of plant operation.

All the Elwell-Parkers in his Foundry—various types of Trucks and a Crane—unite in providing him with a cooperative *System* that Multiplies Manpower by moving TONS on Power Trucks instead of POUNDS by the muscles of men urgently needed right now on other jobs.

Bigger and Quicker Foundry Loads

Multiply Your Manpower!

You can Multiply Manpower just as this Customer has. Add new, speedy, big-capacity Elwell-Parkers to your present "E-P" fleet. Your Trucks then will handle bigger tonnages of your patterns, cores, or castings, or foundry supplies in Boxes, Barrels, or Bags, high-piled on Skids or Pallets.

Elwell-Parker Trucks directly aid in controlling costs so vitally important under price ceiling procedure. So get the most out of your present fleet of Elwell-Parkers. Replacement parts are interchangeable—you need only a small stock.

Like yourselves, Elwell-Parker is establishing new production maximums. But if, like this Customer, you *must* have one or two new Elwell-Parkers, and can supply proper priority, then we will co-operate in furnishing vital Truck equipment to Multiply *your* Manpower and push your War Deliveries ahead of schedule.

The Elwell-Parker Electric Company, 4220 St. Clair Avenue, Cleveland, Ohio.

ELWELL-PARKER *Power Industrial* TRUCKS

ESTABLISHED 1893 • BUILDING POWER INDUSTRIAL TRUCKS SINCE 1906

CERTIFIED SERVICE

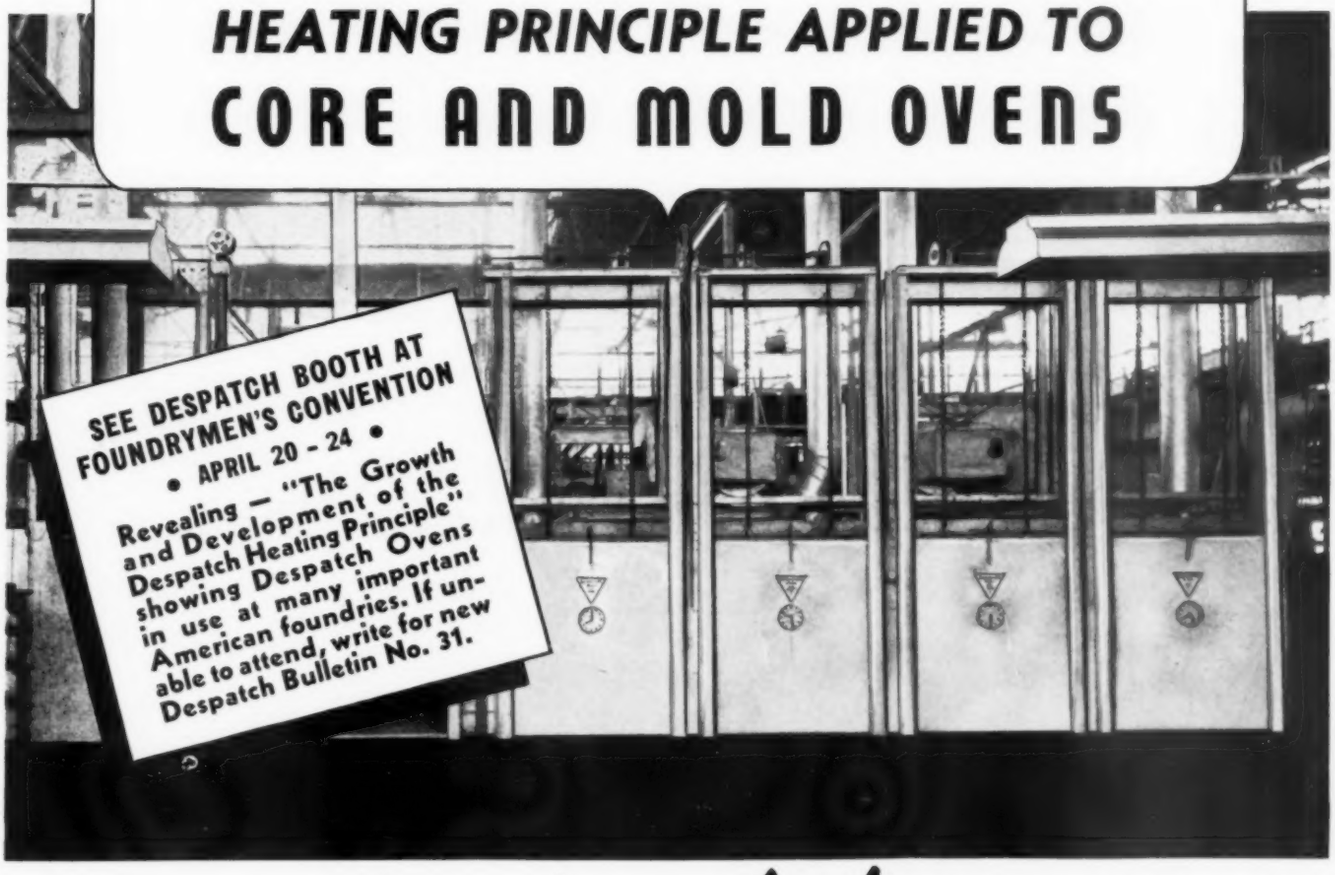
WORLD WAR I WORLD WAR II

GRIT
HOOKS
CASTINGS, FORGINGS, HEAT TREATED WORK, BOMBS, SHELLS,
GUNS, TANK, PLANE AND SHIP PARTS, ARMOR PLATE, ETC.
ALL CLEANED BETTER — FASTER — AT LESS COST WITH
"CERTIFIED" STEEL ABRASIVES

Stop In And See Us
At Booth No. 325-327

PITTSBURGH CRUSHED STEEL CO.
PITTSBURGH, PENNA.
STEEL SHOT AND GRIT CO.
BOSTON, MASS.

THE NEW DESPATCH HEATING PRINCIPLE APPLIED TO CORE AND MOLD OVENS


SEE DESPATCH BOOTH AT FOUNDRYMEN'S CONVENTION
• APRIL 20 - 24 •
Revealing — "The Growth and Development of the Despatch Heating Principle" showing Despatch Ovens in use at many important American foundries. If unable to attend, write for new Despatch Bulletin No. 31.

Boosts foundry output CORES 100% OK —50% LESS TIME AND COST!

Convection heating applied by Despatch speeds up pre-heating-evaporating time—and oxidation. Although new, the DESPATCH principle has been proven superior by numerous operating checks for day ovens, car type ovens, conveyor ovens, tower type ovens and other applications. These tests applied under all foundry conditions show a marked decrease in baking time and drying time and a uniform increase in core and mold quality. Also the processing cost per ton is greatly reduced.

Go all out for Victory—Use Despatch Core and Mold Ovens to step up your foundry production.

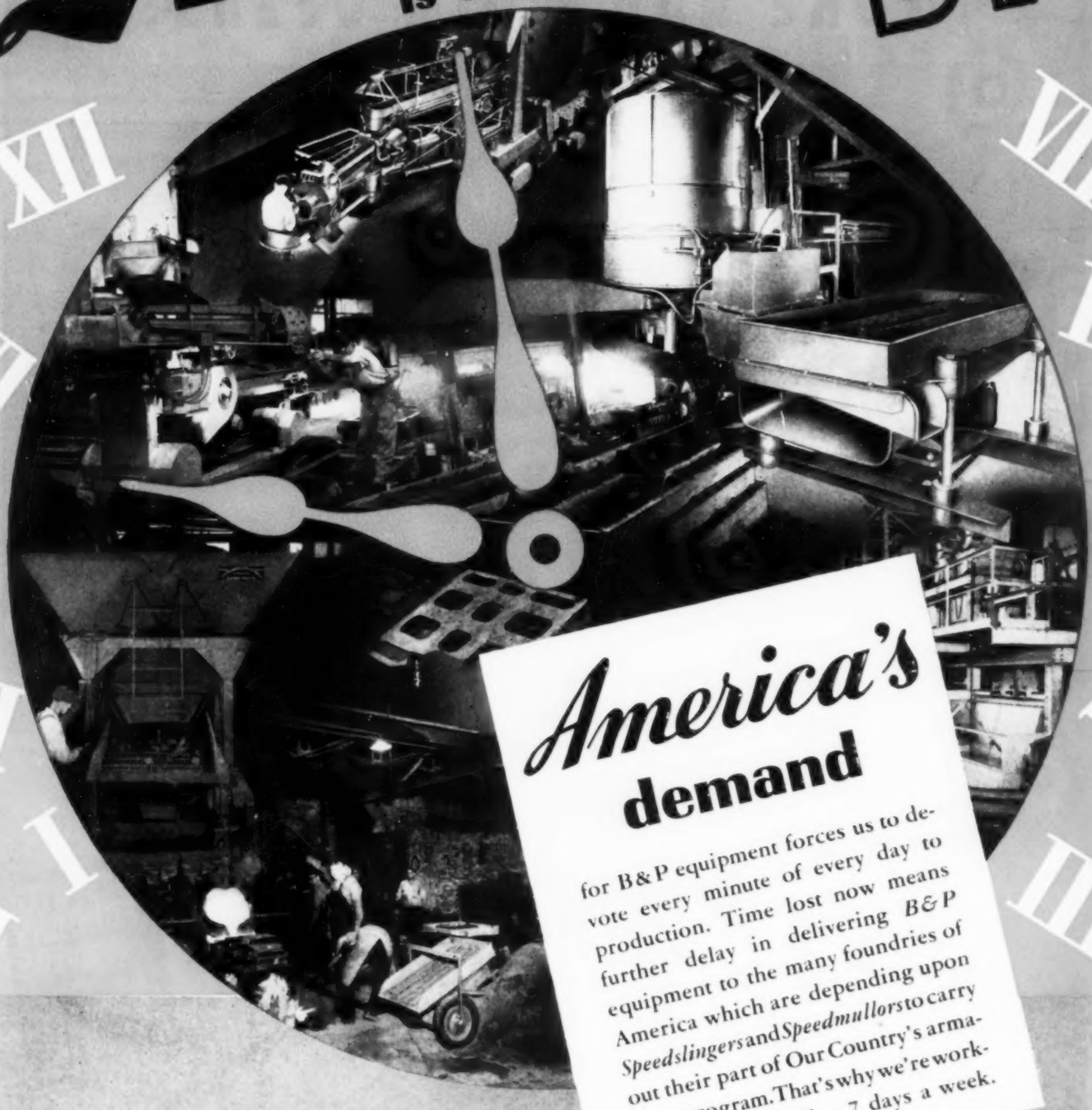
Read explanation of the Despatch heating principle in the **NEW BULLETIN NO. 31.**

Action—

Deliveries are maintained on standard ovens. Immediate attention and fast deliveries are assured on all special core and mold ovens. WRITE, WIRE OR PHONE for IMMEDIATE ATTENTION TO YOUR NEEDS.

DESPATCH OVEN COMPANY MINNEAPOLIS, MINNESOTA

24 HOURS DAILY is the schedule at B&P



America's demand

for B&P equipment forces us to devote every minute of every day to production. Time lost now means further delay in delivering B&P equipment to the many foundries of America which are depending upon *Speedslingers* and *Speedmullors* to carry out their part of Our Country's armament program. That's why we're working 24 hours daily—7 days a week.

We have always introduced new and *"Better Methods"* at the Foundry Convention and Allied Industries Show. We'll be there again when our present job is done.

THE BEARDSLEY & PIPER C

a huge majority of all armament castings are made with B&P equipment

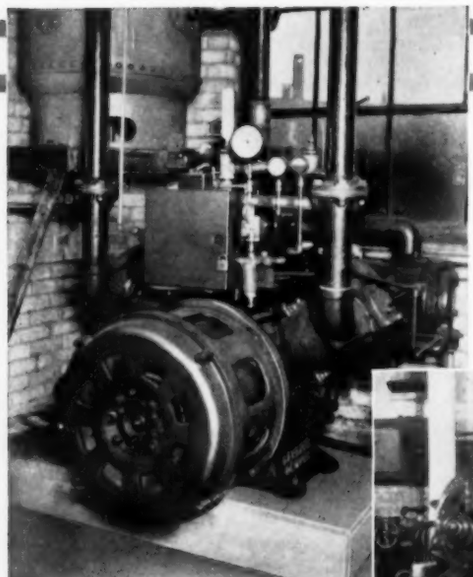
we haven't pulled the switch in three years

Speedslingers, *Speedmullors* and other B&P products are producing *previously unheard* of quantities of castings for guns, turrets, ship rudders, keels, tanks, jeeps and other work so necessary for America's all-out effort.

Speedslingers **(standard types) ram 1,000,000 pounds of sand every 8 hours at a $450.00 saving.** ***Speedmullors*** **remove fines, mull, cool and aerate sand that is unequalled for flowability and rammability.**

R COMPANY 2541 NORTH KEELER AVENUE • CHICAGO

FOR RUSH PRODUCTION SCHEDULES!



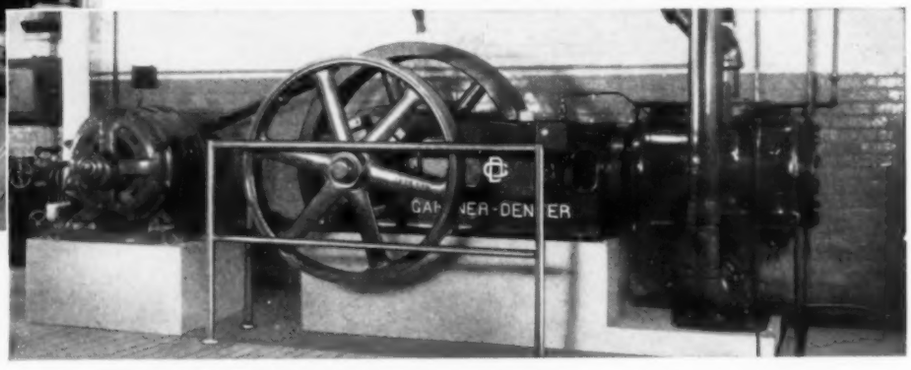
Gardner-Denver "WB" Compressors are built in a capacity range from 142 to 445 cu. ft. displacement per minute.

•

Gardner-Denver "RX" Compressors are available in capacities from 89 to 1292 cu. ft. displacement per minute.

←—GARDNER-DENVER "WB" TWO-STAGE VERTICAL WATER-COOLED COMPRESSORS PROVIDE BIG CAPACITY IN A MACHINE OF UNUSUAL COMPACTNESS

- Because efficiency is comparable to that of much larger capacity compressors.
- Because the rugged unit is especially designed to conserve space.
- Because fully water-cooled cylinders provide lubricating oil economy and cooler discharge temperatures.
- Because balanced construction assures quiet operation.



↑—GARDNER-DENVER "RX" SINGLE STAGE HORIZONTAL AIR COMPRESSORS PROVIDE A LARGE SUPPLY OF *LOW-COST* COMPRESSED AIR

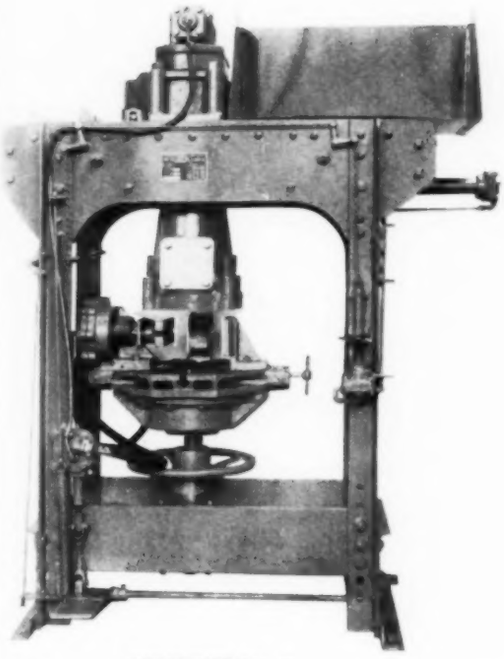
- Because their horsepower requirements are unusually low.
- Because their rugged, dirt-free construction assures long service.
- Because liberal, unrestricted valve and port areas step up efficiency.
- Because air output is automatically regulated to fit air needs.

GARDNER-DENVER PRODUCTS KEEP SPEED TO VICTORY

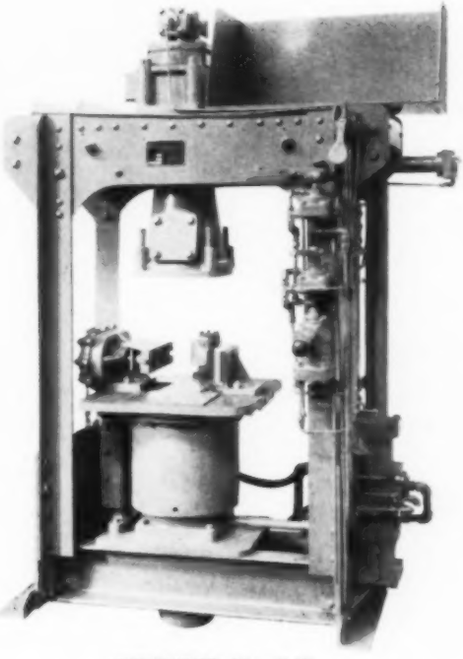
Send for complete information on these modern, cost-saving Gardner-Denver Compressors. Gardner-Denver Company, Quincy, Illinois

GARDNER-DENVER *Since 1859*

Core Blowers



DEMMLER No. 2



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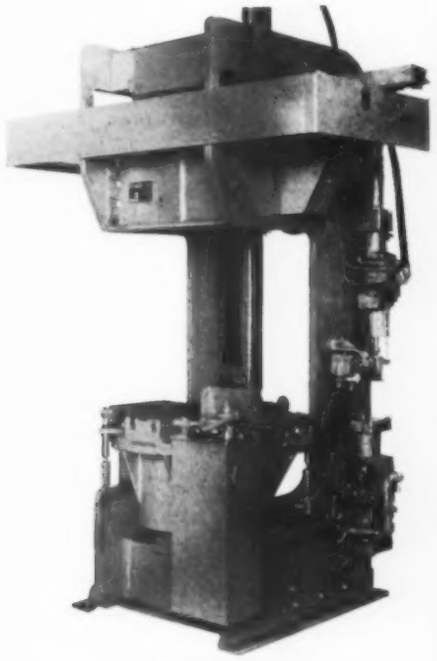


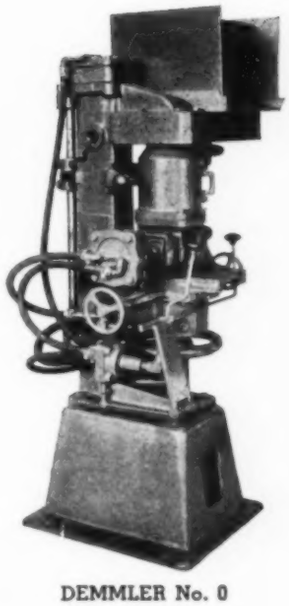
DEMMLER No. 8

30 years of specialization on this one problem—the blowing of cores—working with and for foundrymen, has given us knowledge and experience which is one of the many extra, guaranteed values obtained with the purchase of a DEMMLER core blower.

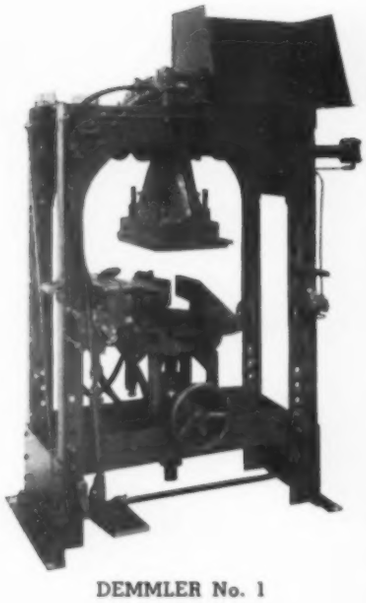
Hundreds of Demmler core blowers in constant use throughout the foundry industry. Available in 5 standard sizes (special types and sizes made to suit any unusual requirement).

Write for descriptive folders.

WM. DEMMLER & BROS.
KEWANEE, ILLINOIS



DEMMLER No. 0



DEMMLER No. 1

DEMMLER

CORE BLOWERS Exclusively

DELTA

DELTA PARTEX... NUT SHELL PARTING

The modern scientific Lycopodium replacement. Absolutely safe and non-hazardous. It is economical . . . costs only a fraction of the cost of Lycopodium. The most efficient parting available . . . insures better core and mold surfaces.

DELTA NO-VEIN COMPOUND

Another distinct contribution of Delta Research Laboratories to the Foundry Industry. A specially compounded series of oxides . . . developed and tested for hot strength with the use of the Dilatometer . . . and proven in actual practice, for over two years, in many of the nations leading foundries. NO-VEIN COMPOUND eliminates veining . . . cuts cleaning room costs . . . insures improved casting surfaces.

DELTA OIL PRODUCTS CO.

RIGHT NOW when the combined facilities of industry are being used to capacity in the defense of our nation . . . when supplies of certain essential materials are difficult to obtain . . . or cut off entirely . . . the need for RESOURCEFULNESS is paramount. Substitutes must be found . . . methods and means to speed production must be developed and perfected. The utter importance of RESEARCH in FOUNDRY PRACTICES is, today, recognized and accredited and the competent, comprehensive facilities of DELTA RESEARCH LABORATORIES are playing an increasingly VITAL PART.

SEE OUR EXHIBIT • BOOTH 243 • FOUNDRYMEN'S CONVENTION • APRIL 20-24

PRODUCTS FOR THE FOUNDRY

DELTA CORE AND MOLD WASHES

GRAKOAT . . STEELKOAT . . Z-KOAT . . BLACKOAT

All Delta mold washes are Dilatometer proven for hot strength to insure positive adherence to core and mold surfaces. They produce high fusion surfaces which are highly refractory and absolutely moisture-proof. In use, these washes remain in suspension, eliminate gas formation, and are non-reactive in contact with molten metals.

Most economical to use . . . cut cleaning room costs . . . produce smoother surfaces and more perfect castings.

DELTA CORE OILS

Scientifically developed and laboratory tested . . . checked for high tensile strength and fast baking. All Delta core oils are compounded to meet the most exacting requirements in all phases of foundry core practice.

DELTA SPRAY BINDERS

A product of unusual value for green sand molds.
Produces, almost instantaneously, dry mold surfaces, thereby eliminating hours of oven or torch drying. Very easy and most economical to use.

MANUFACTURERS OF INDUSTRIAL AND AUTOMOTIVE OILS, GREASES, AND COMPOUNDS

MILWAUKEE WISCONSIN

We'll look for you at Booth 465

Suppose you have the price of a new vibrator to invest. Which would you prefer for your money, that new vibrator or an indefinite number of dilapidated, decrepit and disabled affairs?

Assume for one moment that the second hand ones did have potentially more service in them than one new vibrator. *How much would it cost to get that service out of them?* Plenty, as a rule. In any event, a skilled maintenance man, receiving the present rate of remuneration, can spend his time to far better advantage than by playing nurse to a more or less choice collection of broken-down vibrators.

We have been urging this argument off and on for three years now. Have you been convinced? If not, let's talk it over at the Convention in Cleveland.

* * *

SPO also designs and builds molding machines and pattern equipment, and guarantees them to be in full accordance with your specifications.

SPO

INCORPORATED

Manufacturers and Specialists in Molding Machines, Vibrators and Patterns for Production

7500 GRAND DIVISION AVENUE • • CLEVELAND, OHIO

Your foundry may be one of thousands working on war materials. Maybe the specifications call for an iron never made in your foundry before. Maybe there are several ways of meeting the specifications, depending on the particular base iron or practice. Maybe we can help you develop the best and most efficient way for your foundry; help to conserve critical materials.

An application story may give you an idea: An idea that will reduce rejects. An idea that will turn out more pieces per die. An idea that will improve machinability and speed up production. An idea that will conserve high speed tools. An idea for a change in alloy combinations which will conserve the most strategic materials, or an idea that will make a gray iron casting serve where steel, or aluminum, or brass was required before.

Some of your work may carry low priority ratings or none at all, but is still essential to industry. Maybe we can help you adjust practice to meet the specifications with the materials available.

Unfortunately, we can't go around to each foundry, one-by-one. There are just too many foundries, and it would take too long. But we can present timely facts through the trade papers—offer our services or transmit an idea to the whole industry in jig-step time.

In our opinion, this is a vital function—more vital now than ever. Call it "idea distribution"; coordinating the knowledge and skills of American industry by the fastest method and with the least man-power.

Important? Well, as one man wrote us recently: "Keep the material stimulating—and keep it coming."

Our guess is he spoke for Industry.

VANADIUM

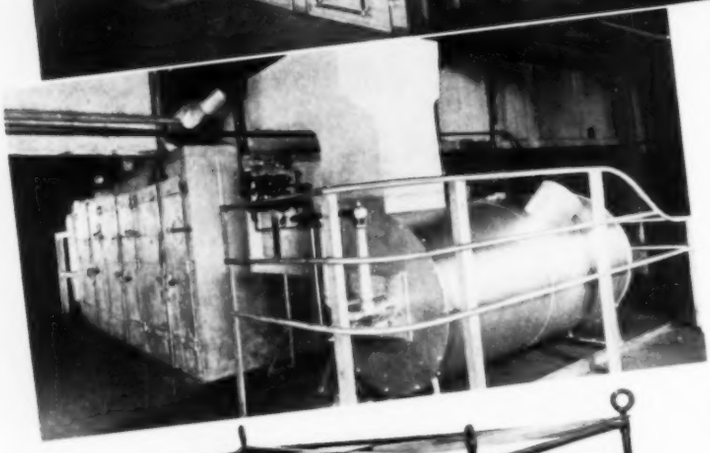
CORPORATION OF AMERICA · NEW YORK, N. Y.

FERRO-ALLOYS

MAEHLER

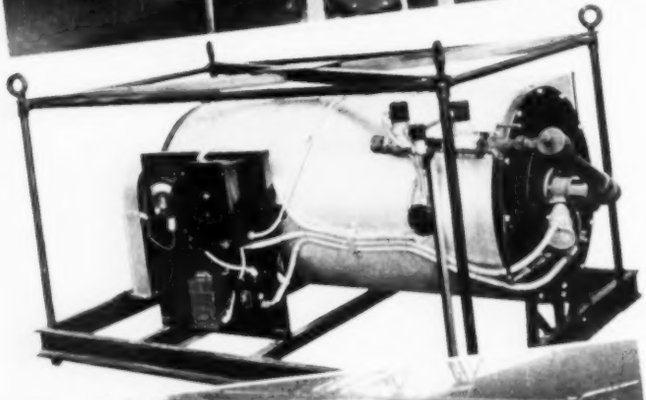
CORE AND MOLD OVENS

• Maehler builds a complete range of oil and gas fired and electrically heated recirculating airheat core and mold ovens — and accessory handling equipment. These ovens feature heat uniformity, high output, low cost and safety. Complete information on request.



AIRHEAT CONVERSION UNITS

• Maehler heaters and recirculating airheat systems can be installed to modernize old style brick or metal ovens. Results from many such installations have been outstanding — outputs have increased as much as 6 times, with better work.



PORTABLE MOLD DRIERS

• These efficient units are supplied with wheels or for handling by cranes or trucks. They are complete airheat units, easy to handle and produce results comparable in uniformity of work to mold and core ovens.

HEAT TREATING FURNACES

• Maehler recirculating airheat ovens and furnaces for normalizing, annealing, tempering, bluing, aging, stress relieving, drawing, etc., are highly successful in producing uniform work at a high output. Typical installations described in new Heat Treating Bulletin.

FOR FASTER WORK — UNIFORM HEAT—LOWER COSTS—MORE OUTPUT PER SQ. FT.

Write for Literature

The Paul Maehler Company

2200 W. Lake St., Chicago, Ill.

TOUGHENING THE HIDE OF A HELL-BUGGY!

● A tank is no better than its protective armor. And to stand up under anti-tank fire, that armor must be exceptionally tough.

This toughening process is carried on in large annealing furnaces in which super refractories by Carborundum play an important part.

These refractories are widely used for the hearths of annealing furnaces. Produced from silicon carbide, they have unusual properties which offer many advantages in installations of this type.

Their high thermal conductivity results in faster furnace operation and more even heat distribution. Because of their high refractoriness and hot strength, the hearths give longer life—remain flat longer. Thus they speed vital defense production, help insure uniformity of results and reduce the number of rejects.

You, too, can take advantage of the services of Carborundum Brand Super Refractories—services that are being rendered in other plants. We'll be happy to give you more details.

REFRACTORY
CARBORUNDUM
PRODUCTS

Carborundum is a registered trade mark of and indicates manufacture by The Carborundum Company

IT ALSO TAKES SAND AND WATER
TO Blast THE AXIS POWERS
NOW Is The Time . . .
See What HYDRO-BLAST
Can Do For You!
THE HYDRO-BLAST C

SEE WHAT

HYDRO-BLAST DOES !

SEE IT AT A. F. A. CONVENTION • SPACE 410-412

You saw Hydro-Blast exhibited at previous shows; but you should see it in operation today in all types of foundries, on all kinds of castings—steel, gray iron, magnesium, brass and aluminum. You should see it *clean* castings *cleaner* than any method or mechanism ever devised. You should compare with Hydro-Blast your costs of knocking out cores, cleaning castings, washing and recovering valuable sand.

SEE HOW

HYDRO-BLAST DOES IT!

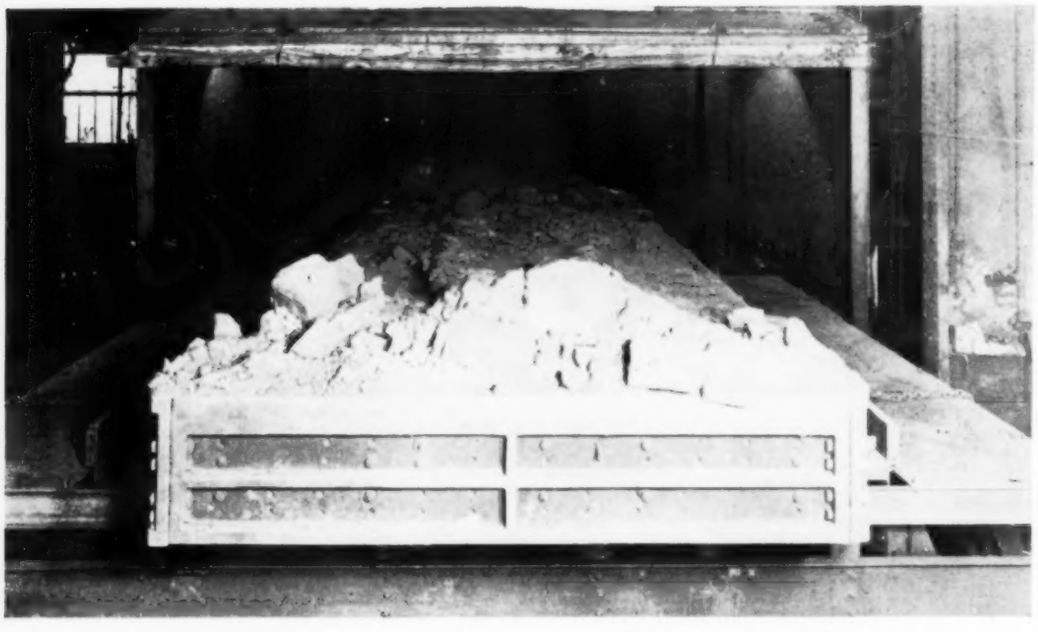
SEE HYDRO-BLAST SAVE TIME, MATERIALS AND LABOR

Hydro-Blast requires no skilled labor—an all-important fact to consider when United States employment officials are threatening to induct skilled labor into war industries. The Hydro-Blast and one operator perform all cleaning functions. The Operator handles the "gun" with ease, merely directing the fine stream of sand and water against the casting at a velocity in excess of three miles a minute.

T CORPORATION 3118 CLYBOURN AVENUE, CHICAGO

Simplicity Foundry Equipment

Doing Giant's Work!



A "Quad Unit" of four 4′ x 6′ Shake-Outs handling a 110,000 lb. flask.

Simplicity Gyrating Shake-Outs are built in "Dual Units" and in "Quad Units" to handle those extra heavy castings and flasks. Jobs, such as illustrated above, have been shaken out without any operating problem for more than four years. The design and construction of the Simplicity units enable them to do this work without trouble.

Simplicity Shake-Outs are available for every type of casting or flask cleaning operation, ranging from very small work up to 100-ton loads. Our Sand Screens and Portable Sand Units also serve a vital need by producing better molding sands, giving a definite reduction in scrap losses. Over 375 foundries are today using Simplicity Foundry Equipment to increase production and cut operating costs.

Are you building a new foundry or planning to increase production in your present foundry? If so, have our engineers check your problem to recommend a guaranteed installation of Simplicity Foundry Equipment. We also will be glad to discuss your problems at the Foundry Show in Cleveland.

You are invited to Booth No. 474

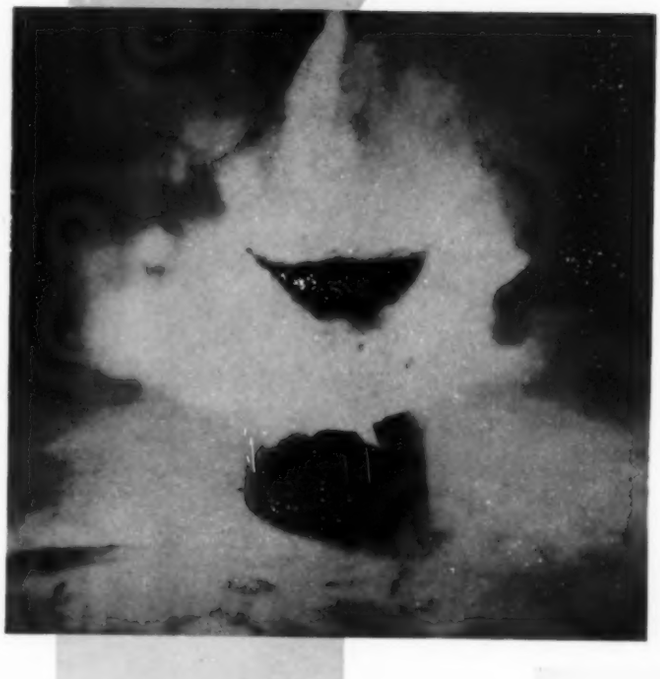
Simplicity Engineering Company

DURAND, MICHIGAN

For Canada: Waterous Limited, Brantford, Ontario

"SIL-X"

REG. TRADE MARK



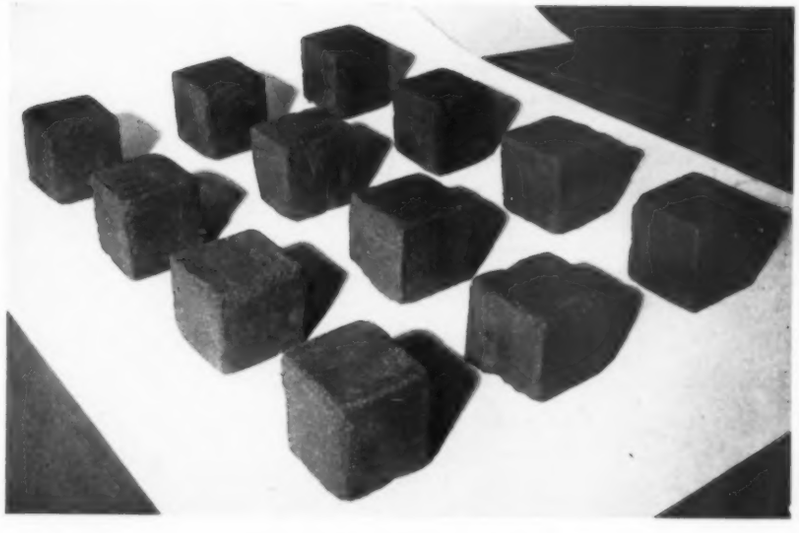
"CHROM-X"

REG. TRADE MARK

FOR FOUNDRY PRACTICE

BOTH GREY IRON AND STEEL, EITHER CUPOLA OR LADLE ADDITIONS

DURING THE CLEVELAND CONVENTION OUR HEADQUARTERS AT HOTEL STATLER



CHROMIUM

MINING AND SMELTING CORPORATION, LTD.

OFFICE AND WORKS

SAULT STE. MARIE • ONTARIO

$1500.00 CASTING SAVED

BY AN AIRCO OXYGEN LANCE

From Mr. A. C. Denison, President of the Fulton Foundry Company, comes this interesting report.

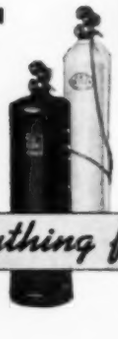
In pouring a large cable drum at their Cleveland, O. plant some hot metal broke through the sand and solidified inside the drum. A chunk of cast iron, coke and sand—about 2 feet in diameter and between 5 and 6 feet long—was thus accidently cast. How to remove it—was indeed a difficult problem.

The first step was a rush call for an Airco Engineering specialist. Then, on his advice, it was decided to use an Airco oxygen lance to cut the "tumor" into pieces small enough to permit their removal through the 9 inch diameter holes at the end of the casting.

This operation—the above illustration was taken while it was in progress—was successfully performed in 40 hours. And it saved a $1,500 casting!

This unusual incident well illustrates the versatility of the oxyacetylene process in the foundry field. It also furnishes a typical instance of how the Airco Engineering Department is always ready to aid its customers. Airco's broad experience is available not only when confronted with unusual problems, like the one just related, but also for consultation on how most effectively and economically to utilize the many advantages of the oxyacetylene flame and the electric arc.

Air Reduction



General Offices: 60 EAST 42nd ST., NEW YORK, N. Y.

IN TEXAS
MAGNOLIA-AIRCO GAS PRODUCTS CO.
General Offices: HOUSTON, TEXAS
OFFICES IN ALL PRINCIPAL CITIES

AIRCO — WILSON

Anything and Everything for GAS WELDING or CUTTING and ARC WELDING

Efficient Sand Cleaning
Is Important in Small Foundries Too!

● Fully housed in and vented to a dust collector, this revolving breaker screen in a small steel foundry, cleans up to 30 tons of sand per hour, with almost no dust loss at all. Flights on the inside of the unhooded breaker section lift the sand, and drop it down against the solid plate to break up the lumps before the sand passes through the wire mesh screening section. Sprues, gaggers, rods and hard baked lumps are discharged out the end.

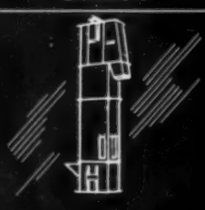
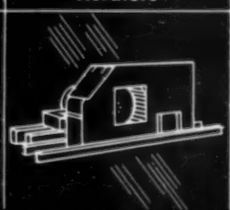
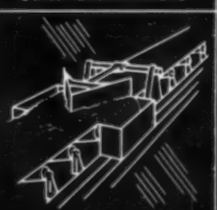
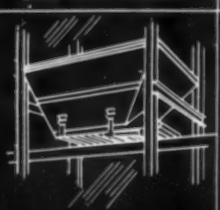
Bartlett-Snow revolving screens can handle dry, hot, cold or any intermediate condition of sand. They range in size from 30″ to 84″ in diameter—meet all requirements for on the floor or overhead mounting—and are used with magnetic pulleys, installed either before or after screening, depending upon conditions.

Our recently issued 40-page bulletin No. 91 illustrates different arrangements of revolving and vibrating screens—and other Bartlett-Snow Foundry Equipment. Copies of this bulletin are available upon request.

THE C. O. BARTLETT & SNOW COMPANY
6201 Harvard Avenue **Cleveland, Ohio**
Engineering and Sales Representatives in the Principal Cities

BARTLETT-SNOW
ENGINEERS AND FABRICATORS FOR THE FOUNDRY INDUSTRY

Complete Sand, Mold and Castings Handling Equipment for any requirement, including

Shakeouts	Elevators	Aerators	Sand Distributors	Bins and Feeders	Apron Conveyors	Dust Collectors
						

ESTABLISHED 1917—INCORPORATED 1924

Snyder Foundry Supply Company

2444 EAST 57th STREET
LOS ANGELES, CALIF.

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TWENTY-FIVE YEARS

of reliable service and still Southern California's leading foundry supply and equipment establishment, using our own offices, warehouses and railroad spur.

For many years exclusive representative in this territory for the following manufacturers:

PANGBORN CORPORATION, *Blast Cleaning and Dust Collecting Equipment.*
PITTSBURGH CRUSHED STEEL CO., *Steel Shot and Grit.*
The TABOR MANUFACTURING CO., *Moulding and Cut-Off Machines.*
SIMPLICITY ENGINEERING CO., *Sand Screens and Shake-Outs.*
HENDERSON BROS. CO., *Tilting Tumbling Barrels.*
BELLEVUE INDUSTRIAL FURNACE CO., *Melting Furnaces.*
SCHRAMM Inc., *Air Compressors.*
STANDARD SILICA CO., *Silica Flour and Sand.*
ILLINOIS SILICA CO., *Crude Moulding Sand for Steel.*
MATHIESON ALKALI WORKS, Inc., *"Purite," the scientific Flux.*
QUANDT CHEMICAL CO., *Core Oil and Washes.*
STOCKTON FIREBRICK CO., *High-grade Fireclay.*
AMERICAN COLLOID CO., *"Volclay" Bentonite.*
ALSO OTHER WELL-KNOWN PRODUCERS

Additional worth-while representation solicited. Contact our Vice-President, Mr. George W. Effinger, at Hotel Cleveland during convention dates

TRADE AUTOMATIC MARK

MANUFACTURERS FOR OVER 30 YEARS

Electric Propelled INDUSTRIAL TRUCKS

THE ACCEPTED "STANDARD" BY METAL WORKING INDUSTRIES—

For Low-Cost . . . Dependable . . . Safe . . . Skid Transportation Systems . . .

"AUTOMATIC" three and five ton low and high lifts have earned the wide acceptance by Metal Working Industries everywhere as the STANDARD for efficient skid transportation and storage systems, because—

In no other competitive trucks of these types are all the "AUTOMATIC" features for greatest overall efficiency . . . exceptional smooth controls . . . utmost ease and flexibility in maneuvering . . . top speed performance with ultimate safety to operator . . . materials and mechanism . . .

Get the full details and facts now concerning these trucks as illustrated here — use the coupon —

AUTOMATIC TRANSPORTATION CO.

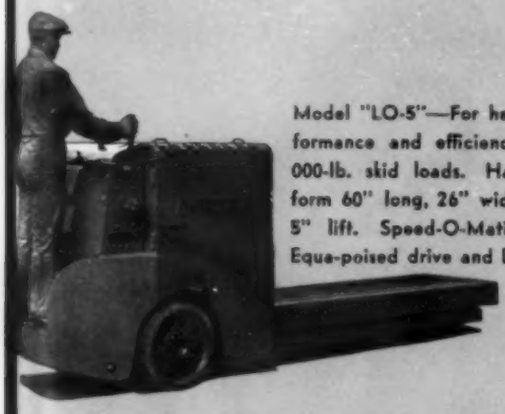
DIV. OF THE YALE & TOWNE MFG. CO.

121 WEST 87th STREET CHICAGO, ILLINOIS

☆

Model "LN-3" — For speedy transportation and placing of 6000-lb. skid loads. Has standard platform 55" long, 27" wide, 10¾" high with 6" lift—Spur gear, drive and lift units—Rotor-Brush control system.

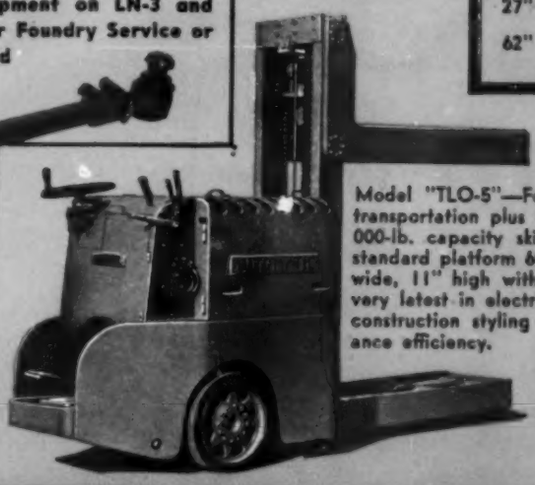
☆



Model "LO-5"—For heavy-duty top-performance and efficiency to handle 10,000-lb. skid loads. Has standard platform 60" long, 26" wide, 11" high with 5" lift. Speed-O-Matic Drive control, Equa-poised drive and Dynatrol lift units.

Model "TLN-3"—For 6000-lb. skidload tiering plus transportation. Has standard platform 55" long, 27" wide, 10¾" high, 62" lift.

Standard equipment on LO-5 and TLO-5 Models. Optional equipment on LN-3 and TLN-3 Models. Ideal for Foundry Service or Abrasive-Ceramic and Gypsum plants.



Outstanding Features

Fully enclosed self-aligning ball-bearing steering connection fitted with synthetic rubber shields. Triple sealed tail wheel bearings and other "AUTOMATIC" features for full protection against foreign materials.

Model "TLO-5"—For heavy duty transportation plus tiering of 10,000-lb. capacity skid loads. Has standard platform 60" long, 26¼" wide, 11" high with 60" lift. The very latest in electrical control—construction styling and performance efficiency.

AUTOMATIC TRANSPORTATION COMPANY

DIV. OF THE YALE & TOWNE MFG. CO.

121 WEST 87th STREET CHICAGO, ILLINOIS

Gentlemen: Please send details on models referred to above.

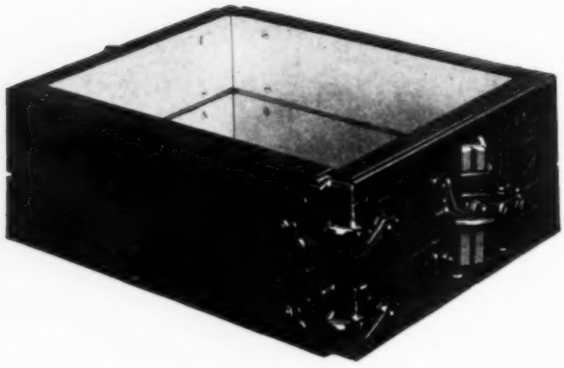
Name_____

Address_____

Company_____

City_____ State_____

WHEN YOU BUY TRUCKS · · *Buy* "AUTOMATIC"



ADAMS CHERRY SNAP FLASK

Custom-built, any desired size, with straight sides or any desired taper. Wide-V, double-V or round pins—triple-locking snaps or lever latches. Trimmings fully adjustable to compensate for wear.

ADAMS CHERRY SLIP FLASK

A very convenient flask for machine or bench, made to your dimensions. Wide-V, double-V or round pins. Dependable and easily operated sand strip mechanism.

ADAMS CAST IRON JACKET

The patented construction of this jacket, involving a combination of horizontal and vertical ribs and machined corners, provides maximum rigidity with minimum weight. Any size, straight or tapered.

ADAMS STEEL JACKET

The strongest and most rigid jacket on the market, to effectively handle the most difficult jobs. Made in any desired size, straight or tapered.

THE ADAMS COMPA

MOLDING MACHINES · FLASK

This is what
Adams Jolt Squeezers
will do for you!

They Will Reduce Production Costs. They are efficiently designed with a minimum number of working parts, and controls are accessible for quick handling.

They Will Assist in Reducing Losses. Close control of jolting and squeezing operations assures the production of uniform molds.

They Will Help to Maintain Uninterrupted Production. Simple design and durable construction provide insurance against production delays.

They Solve the Skilled Labor Shortage. Their operation has been so simplified that no special skill is required to operate them successfully.

See them in Space No. 480
FOUNDRY AND ALLIED INDUSTRIES SHOW
Cleveland, Ohio, April 20th to 24th

NY · DUBUQUE, IOWA · U.S.A.

EQUIPMENT Established 1883

●32nd YEAR

BINDARENE

Core Binder

- AN ORGANIC BINDER
- LIQUID AND POWDER
- MAKES STRONG CORES
- SHAKES OUT CLEAN
- BAKES QUICKLY
- STABLE PRICES
- LOW COST

Supplied through your jobber or direct from us . . . write for test samples

ADDITIONAL JOBBER CONNECTIONS DESIRED, CORRESPONDENCE INVITED

BINDARENE SALES DIVISION

INTERNATIONAL PAPER COMPANY

220 EAST 42nd STREET, NEW YORK

THIS WAY YOU SAVE MONEY...

ROLLED STEEL WITH SOLID CENTER REINFORCING RIB AND SQUARE FLANGES FULL WIDTH BEARING

VISIT Our Booth No. 423 at the Foundry Show

STERLING FLASKS

make work go faster, save time and labor. They're built that way. Here, for example, you can see how the one-piece pin holder lug and handle combination is designed so the moulder can feel the pin with his fingers when he closes the flask. Work goes faster, better moulds are easier to make.

Sterling Flasks have many such features that will help speed production in your plant.

Patent No. 1974292

STERLING
WHEELBARROW COMPANY
MILWAUKEE, WISCONSIN

WHO WOULDN'T BE WORRIED? I'VE GOT TO TRIPLE OUR TONNAGE!

① **"THAT'S A LARGE ORDER,"** I told this worried foundry superintendent. "It's hard enough to do any time but during times like these, when additional floor space is so scarce to get, it's a tough problem. However, I have a suggestion..."

② **"BREAK IT DOWN** into three separate problems—sand-handling, mold-handling and castings-handling! If you can triple the capacity of these bottlenecks in production, most of your difficulties would be solved, wouldn't they?"

③ **"REX CAN HELP YOU** with all three! Rex sand-handling equipment includes belt conveyors, apron conveyors, elevators, feeders—everything you need for sand conditioning—units whose value has been proved in our biggest foundries."

④ **"AND FOR MOLD CONVEYING,** Rex has the equipment—and, more important, the experience—to design a layout best suited to your floor space, whether your daily output is 100 or 1000 tons. Here's one of our recent mold handling set-ups."

⑤ **"FINALLY,** many production-conscious men have learned that Rex apron conveyors are the finest solution to a castings-moving problem. They're easily installed, trouble-free, rugged as you could wish! That's something to think about, isn't it?"

⑥ **"YOU'VE GIVEN ME SOME GOOD IDEAS,"** he said. "The way you've broken down our problem makes it seem much simpler! If Rex equipment will help us triple this plant's output, we'd better go talk it over with our engineers now . . ."

At the Foundry Show Rex men will be glad to tell you about Rex foundry equipment for iron and steel foundries—conveyors, elevators, feeders, aerators, mold cars, etc. See them there, or write to 1716 W. Bruce Street, Milwaukee, Wisconsin.

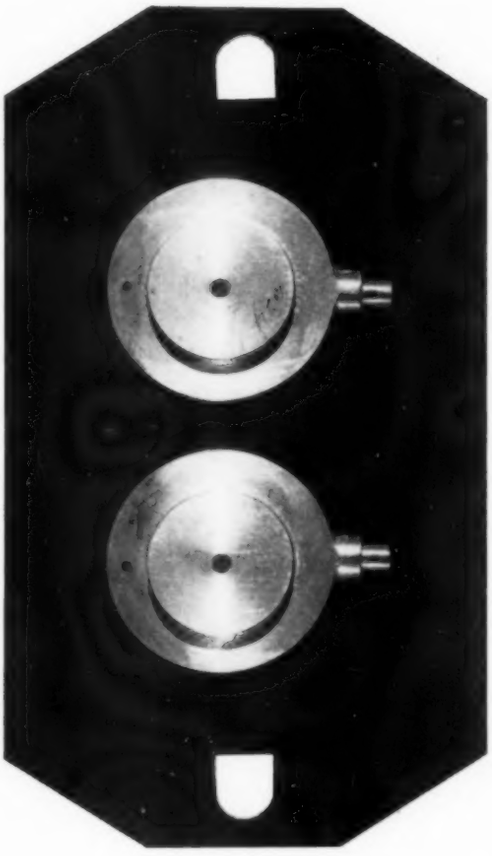
REX CONVEYORS

CHAIN BELT COMPANY OF MILWAUKEE

Baldwin-Duckworth Chain Belt Division, Springfield, Massachusetts • Worcester, Massachusetts
Rex Chain Belt and Conveyor Divisions, Milwaukee, Wisconsin

REX CHAIN BELT COMPANY

LIGNOLITE



Pattern Plates

HALF THE WEIGHT OF ALUMINUM

HALF THE PRICE

UNLIMITED SUPPLY

LIGNOLITE IS AN EXTREMELY TOUGH LIGNIN PLASTIC

- *Easily machined, sawed, drilled, tapped, etc.*
- *Impervious to moisture, oil, grease, dilute acids*
- *Non warping and abrasion proof*

STANDARD SIZES—HOW TO ORDER

Available in all flask sizes $\frac{3}{8}$" to $1\frac{1}{8}$" thick or in 46" x 46" size for own cutting—Plates are octagonal shape with 1" allowance for flask and $2\frac{1}{2}$" allowance for ears. Order by flask size and specify thickness.

Visit Our Display at the Foundry Show

MARATHON CHEMICAL COMPANY

DIVISION OF MARATHON PAPER MILLS COMPANY

ROTHSCHILD WISCONSIN

BOOST PRODUCTION in Your Cleaning

Sharp, Fast Cutting Resinoid Wheels or

TODAY more than ever the grinding problem in the foundry is speedy stock removal—a fast cutting action such as you'll find in the resinoid wheel developed by the Norton Research Laboratories. They started by subjecting the abrasive to special treatments to weed out all but the strong, solid grains that would withstand the severe service of foundry grinding. Then countless resinoid bond formulae were carefully studied and experimented with to develop one with just the right strength—a bond that would hold each grain firmly until its job was done but then release it to bring fresh, sharp grains into action. The result is a wheel with a definitely faster cutting action—and lower grinding costs.

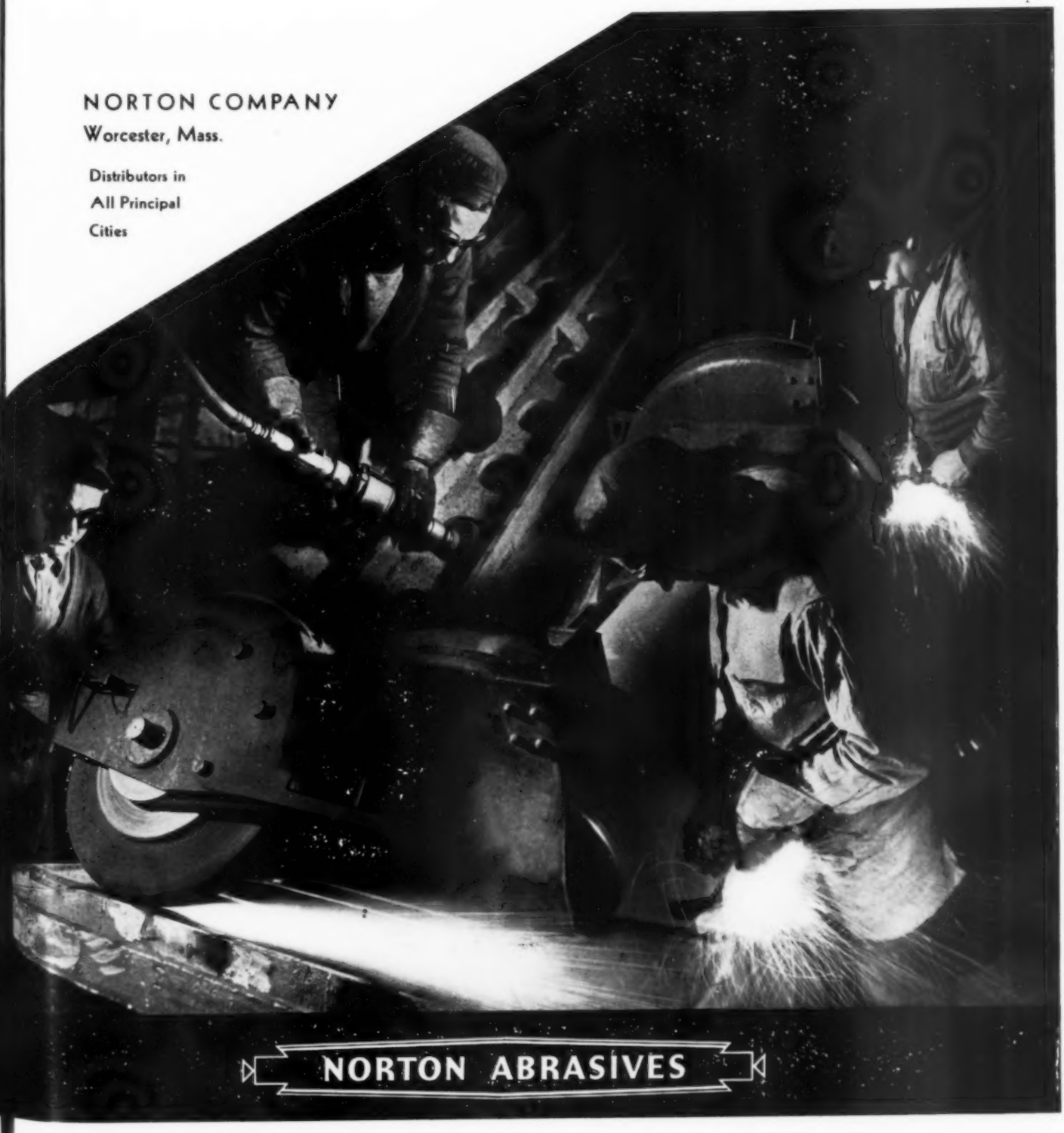
NORTON VITRIFIED WHEELS for operation at 6000 s.f.p.m. are also available for every grinding job in the foundry—Alundum wheels for castings of steel and annealed malleable iron; Crystolon wheels for gray iron, unannealed malleable iron and non-ferrous metals.

W-862

NORTON ABRASIVES

Room with Norton Grinding Wheels

Vitrified Wheels



★ ★ ★ ★ CHICAGO PNEUMATIC NEWS ★ ★ ★ ★

CP HICYCLES CUT GRINDING TIME

BECAUSE OF HIGH SUSTAINED SPEED REMOVE MORE METAL IN GIVEN TIME

Maintenance Low Despite High Speed

NEW YORK — Foundries and other metal-working plants in which grinding is an important operation — and potential bottleneck — are cutting grinding time and speeding overall production with CP Hicycle Electric Grinders. With their high sustained speed, light weight and perfect balance, CP Hicycle Grinders not only remove more metal but also materially lengthen the life of grinding wheels.

Plant records show that CP Hicycle Electric Grinders, Sanders, Drills, Reamers, Nut Runners, etc., have the lowest maintenance costs of any type of portable tools. Write for complete data.

CHICAGO PNEUMATIC TOOL COMPANY

General Offices: 8 East 44th Street, New York, N. Y.

↑ **WITH THEIR HIGH SUSTAINED SPEED,** Chicago Pneumatic Hicycle Grinders remove more metal in a given time. Because Chicago Pneumatic Hicycle speeds do not fluctuate, the emery wheels last longer.

↑ **SIX CP HICYCLE ELECTRIC GRINDERS** replaced eight grinders of another type in a well-known plant. Illustrated is one of five models of Chicago Pneumatic Hicycle Electric Angle Grinders and Sanders.

↑ **HEAT CONDUCTION FROM MOTOR** to housing through ribs . . . ventilated rotor . . . ample cooling air from fan . . . exhaust over spindle case (not in operator's face) make the CP Hicycle cool running grinders.

← **SANDING DOWN EDGES** of bottle washing machine tank. Light weight and high sustained speed make the CP-401 ideal for all types of angle sanding.

CHICAGO PNEUMATIC

ELECTRIC TOOLS

ALSO: Air Compressors, Pneumatic Tools, Hydraulic Aviation Accessories, Diesel Engines, Rock Drills

HICYCLE and UNIVERSAL
Drills
Reamers
Nut Runners
Screw Drivers
Grinders
Sanders
Tappers

MAGNESIUM *Melting*

Past

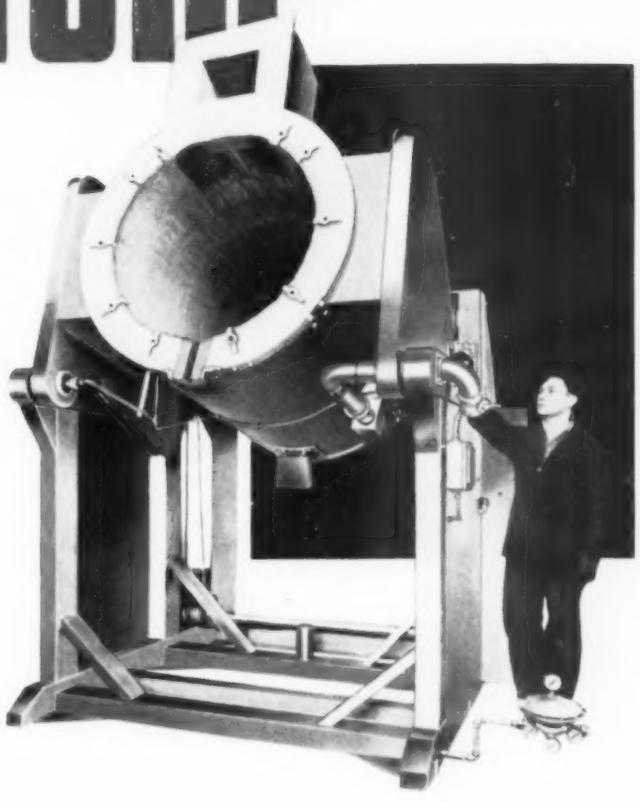
A few years ago Magnesium was only a laboratory metal.

Present

Approximately 50,000,000 pounds of Magnesium were commercially produced in 1941.

Future

Published estimates indicate plans for an immediate expansion of Magnesium production to 725,000,000 pounds annually.



THIS large motorized nose pour melting furnace, with a capacity of 1700 pounds in magnesium alloys, excellently demonstrates Fisher's ability to fully meet today's equipment needs of magnesium melters. Fisher is playing an important part in this branch of our war production and is enlisting a wealth of experience in melting room equipment designing and building, melting room layout, and plant and equipment coordination preparatory to fully meeting future magnesium demands. The Fisher Line also includes a wide range of gas and oil fired Crucible Melting Furnaces (stationary, manually operated tilting types and motorized units), Iron Pot Melting Furnaces, Aluminum Melting Furnaces, Combination Blower and Oil Pump Systems, Centrifugal Blowers, Burners, Metering Valves, Blast Gates, etc.

Have you received your copy of "Fisher Products for the Foundry"?

1742 NORTH KOLMAR AVE., CHICAGO, ILLINOIS

Fisher FURNACE COMPANY

WASHED DRIED AND SCREENED SILICA SAND

Carefully Selected and Graded for Foundry Use—

FOUNDRY men throughout the country know the exceptional qualities of the uniformly screened grades of silica sand produced by the Ottawa Silica Company.

The grains being almost spherical, afford greater permeability and consequently finer sand can be used, effecting better finish.

Ottawa sands are durable! They do not break up! They are ideal for sand slinger work and are without equal for all foundry purposes where synthetic sands are employed.

FLINT
MOLDING AND CORE SAND
SILICA

A HARD, fast-cutting, thoroughly washed, dried Sandblast Sand, screened to uniform size, is produced by the Ottawa Silica Company and sold under the trade names FLINT SHOT and DIAMOND SANDBLAST SAND. It is the most economical agent that can be employed for all kinds of exacting sandblast cleaning. The round, pearl-like grains are hard as flint. They do not split up, but wear down uniformly and can be used over again many times. This abrasive flows freely, requiring less air power and gives the castings a smooth, silvery-like, velvety finish. Ask for our booklet, "Sandblasting Up To Date".

FLINT
IT PAYS TO USE
SHOT

DIAMOND
SAND BLAST

THE Ottawa Silica Company's three mills operate continuously the year round, making it possible to supply foundries with material promptly. Production includes a complete line of foundry sands suitable for molds, cores, furnace bottoms, sandblasting, for use generally in the steel, grey iron and non-ferrous fields—also Ground Silica (Silica Flour). The Ottawa Silica Company's engineering staff is always available for consultation and service on problems relative to the use of Ottawa Sands.

CRYSTAL
99% PURE
SILICA

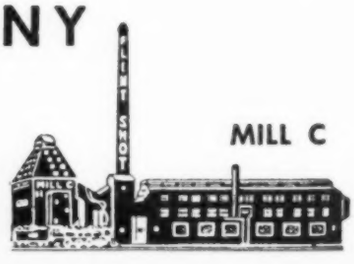
OTTAWA SILICA COMPANY

Ottawa, Illinois

MILL A

MILL B

MILL C



New Ladle Handler provides "Finger-tip" Raising & Lowering

MAKES CONTINUOUS POURING SAFE AND EASY

One man can pour a large number of molds continuously and safely with the new Whiting E-Z Pour Ladle Handler mounted on an overhead monorail system. An exclusive feature of this ladle handler is its highly efficient hoisting mechanism, which is operated by a large hand wheel. The heaviest ladle can be lifted easily by a light "finger-tip" touch on the hand wheel.

Other Advantages of the E-Z Pour Ladle Handler

• SPOTS LADLE QUICKLY
Rigid frame eliminates any swinging tendency of the ladle and places it under complete control of the operator at a time when every second counts.

• HOIST IS SELF-LOCKING
The hoist mechanism is self-locking in any position so that the ladle cannot possibly drift.

• POURS FROM ANY DIRECTION
A swivel clamp is provided so the ladle can be poured from the most convenient position.

• HAND WHEEL SHIELDED FROM HEAT
A metal shield protects the wheel from the heat of the molten metal, keeping it cool to the touch.

• POSITION OF HAND WHEEL IS FIXED
The hand wheel remains at a fixed level, which does not change when the ladle is raised or lowered.

• REQUIRES LITTLE MAINTENANCE
All running parts are totally enclosed in dirt-proof housings and operate in a bath of oil. Thus, wear and maintenance are negligible.

The Whiting Ladle Handler can be furnished in capacities ranging from 300 lbs. to the maximum carrying capacity of the monorail track. It has a lift of two feet. Use it with any style of ladle bail.

WHITING
E-Z POUR LADLE HANDLER

Write for Descriptive Leaflet "Continuous Pouring Made Easy"

☐ Please send me your leaflet, "Continuous Pouring Made Easy."

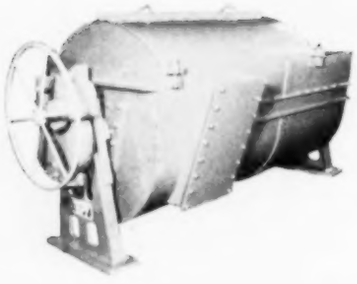
☐ Please send me your 24-page booklet, "Better Ladles."

Name .....

Company .....

Address .....

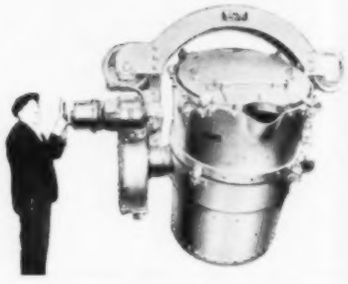
LONGER-WEARING LADLES
for every foundry need



U-Shaped ladle for mixing and desulphurizing, with E-Z Pour gearing.

40 Lbs. to 40 Tons

The standard Whiting line includes geared crane ladles, insulated ladles, U-ladles, cylindrical ladles, teapot spout ladles, bottom tap ladles, desulphurizing ladles, truck ladles, reservoir ladles, hand and shank ladles, and trolley ladles. Whiting will also build special ladles of all types. Every Whiting unit is built to give many long years of service.



Special 8-ton, motor-tilted, monorail transfer ladle with insulated cover.

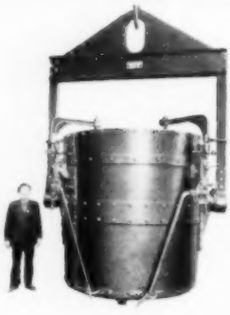
Standard V-bail type, geared ladle with E-Z Pour gearing.

Standard crane ladle equipped with tipping mechanism.

Hand-operated bottom tap ladle, for car wheel foundries.

Trolley ladle with insulated cover and double end shank.

Standard crane truck ladle with helical-worm, E-Z Pour gearing.



35-Ton, plain bottom tap ladle —with two tapping mechanisms.

Special teapot spout, geared crane ladle with square bail.

Cylindrical type of pouring ladle with E-Z Pour gearing.

First Class
Permit No. 101
(Sec. 510, P. L. & R.)
Harvey, Ill.

BUSINESS REPLY CARD
No Postage Stamp Necessary If Mailed in the United States

2c Postage Will Be Paid By—

WHITING CORPORATION
15607 LATHROP AVENUE
HARVEY, ILLINOIS

WHITING
LADLES

CUPOLAS • FURNACES • CHARGING EQUIPMENT

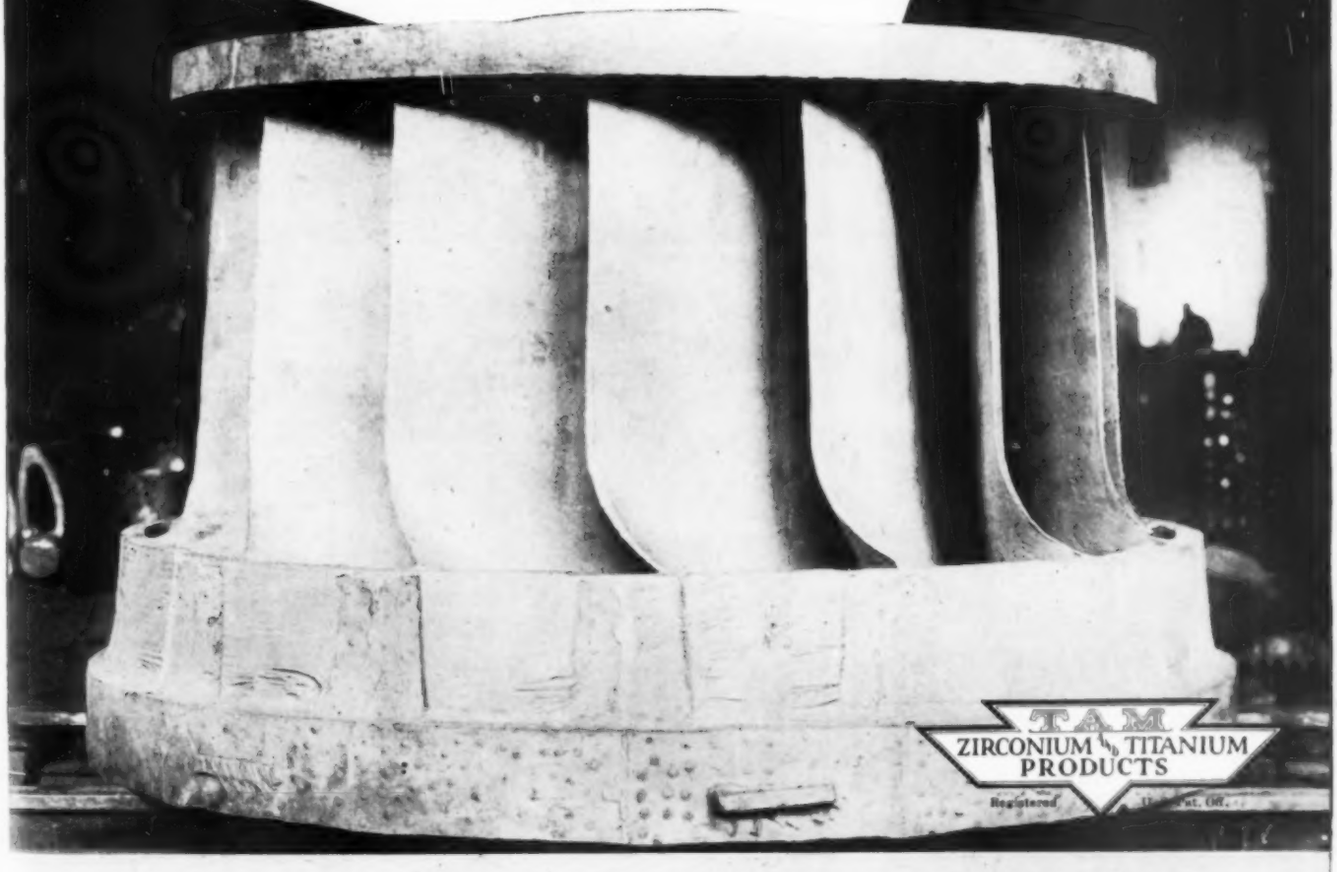
SMOOTH FACES FOR CASTINGS

TAM Zirconite super-refractory mold and core washes produce smoother surfaces and reduce cleaning costs

By resisting the burning-in of the molten metal, TAM Zirconite Mold and Core washes speed up output of good castings by reducing the number and time of cleaning and finishing operations. Available in three grades: Zirconite A has a melting point above 3775° F.; Zirconite B has a melting point above 3600° F.; and Zirconite C, for special uses, has a melting point above 3600° F. They are quickly mixed by adding to water, and can be applied by either spraying, swabbing or painting on cores and molds. Write for complete details, today.

TITANIUM ALLOY MANUFACTURING COMPANY

Zirconite Wash was used on this 94,000 pound .30-.35 carbon steel casting—11'6" high 14' diameter. Of special interest is the fact that no nails were used in the facing.



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EXECUTIVE OFFICES: 111 BROADWAY, NEW YORK CITY

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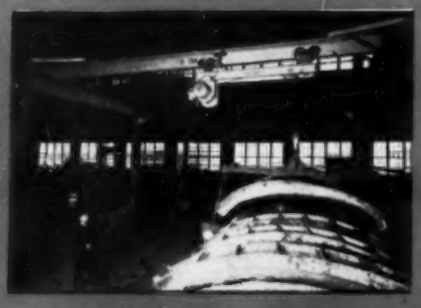
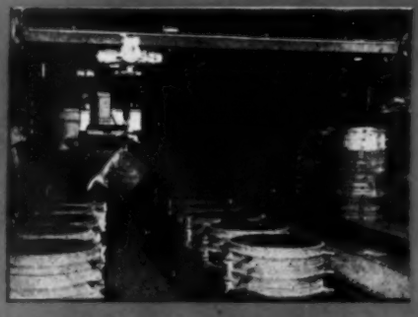
Typical Installations by CHICAGO TRAMRAIL



Furnace Crane



Molding Floor

Heat Treating

Cleaning Room

Steel Warehouse

NEW!

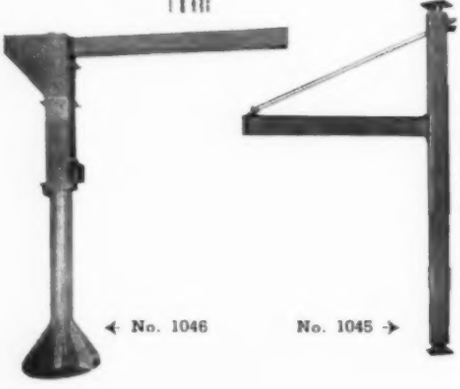
A Special Handling System Developed for Furnace Rooms by Chicago Tramrail

Send Us Your Sketch

Would you be interested in knowing how your furnace room might be served in a similar manner? We'll be glad to tell you if you will send us a drawing of your furnace floor layout, overhead clearance, number of furnaces, distance of crane travel. The above system may be duplicated at reasonable cost.

Need a GOOD JIB CRANE in a HURRY?

No. 1044 →



← No. 1046 No. 1045 →

■ Easily and quickly installed in your foundry to speed up production. CHICAGO jib cranes, constructed in our own plant to your specifications, are unusually well-made and moderately priced.

WALL TYPE—No. 1044

■ This swinging bracket jib crane is a popular unit. For hand or electric hoist, it comes in capacities of ½ to 3 tons and up to 20 ft. radius.

MAST TYPE—No. 1045

■ Ideally suited for capacities to 5 tons. For either hand or electric hoist. Complete circle swing. Made for your requirements.

PILLAR TYPE—No. 1046

■ A strong unit with self-supporting jib crane with complete circle-swing. Capacities ½ to 2 ton with 20 foot radius. Built to last.

Special service cranes also designed for any unusual foundry need.

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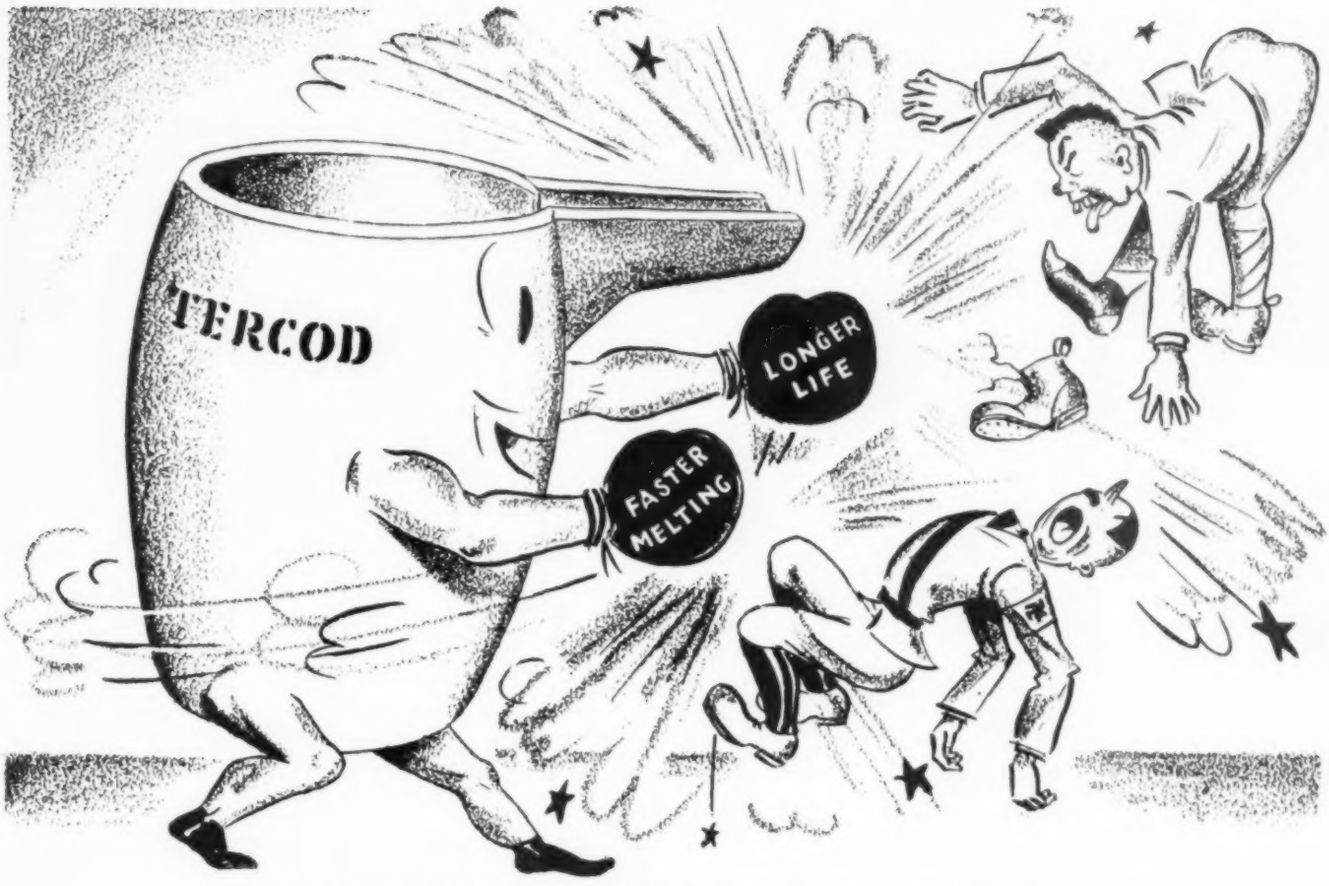

HELPING UNCLE SAM GIVE 'EM THE OLD "ONE-TWO"

TERCOD Crucibles are right in there throwing punches with the rest of America's war production forces.

And - Electro is proud to remind the war industries that TERCOD Crucibles are composed mainly of carbon bonded silicon carbide, with only a minimum amount of critical imported material.

Regularly serving brass, copper, aluminum and magnesium industries, TERCOD Crucibles have been restricted for several months to all-out war production work.

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Used in melting alloys for casting parts for aircraft, battleships, ammunition, arms, bombs and other vital implements of war.

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And "the best" in Chaplets, Chills and Superchills (patented) has long been identified with the fine old name of Fanner.
Today, more than ever, when there can be no compromise with either time or quality in turning out the best possible castings in the shortest possible time, the need for these vital Fanner products is a very essential "must" in every successful production speed-up.
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1

(1) ECP is the *largest* American producer of bonding clays for foundries. That means responsibility and adequate facilities. We continue to ship all orders within 24 hours.

2

(2) ECP is the *oldest* producer, with 18 years' specialization in your field—*exclusively*. At your command is an ever-growing fund of scientific data, without obligation.

3

(3) *Only* ECP offers you a choice among five distinct bonding clays and numerous combinations. We are therefore uniquely able to assure you of "top" results on every job.

4

(4) *Only* ECP offers you seven trained, *full-time* service men who average 10,000 calls a year on foundrymen. Feel free at any time to ask for a personal visit and analysis.

5

(5) Every order brings with it the help of five laboratories expert in foundry research.

* * *

These are five out of many reasons why, when you deal with ECP, you may be sure of getting *better molds, better castings, less scrap, and most bond strength per dollar.*

Still another service engineer! ECP now offers you without obligation the counsel of seven service men with an average background of 13 years.

DIXIE BOND
Highest green strength.
Highest flowability.
Moderate dry strength.

REVIVO BOND
Most refractory, durable and economical.

BALANCED REVIVO
Highest dry strength.
Ideal for dry sand work.

REVIVO SUPER BOND
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BLACK HILLS BENTONITE
High green strength.
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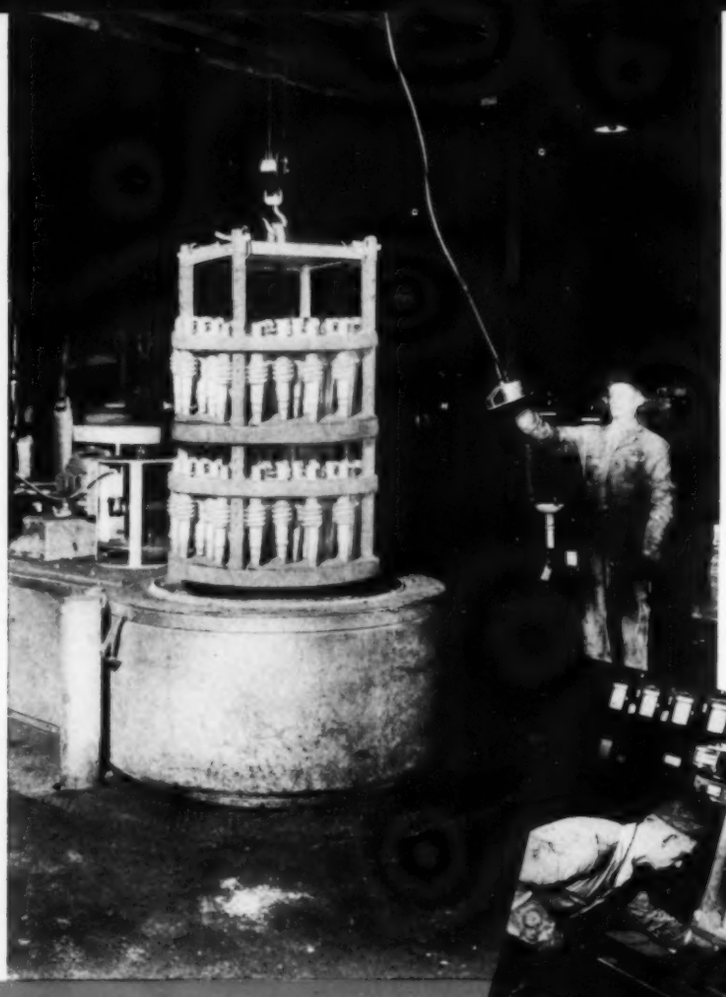


LEFT: A load of 20 lb. worm gears being removed from a Super-Cyclone.

BELOW: Worm gears being heated in the Conventional Radiation Type Furnace.

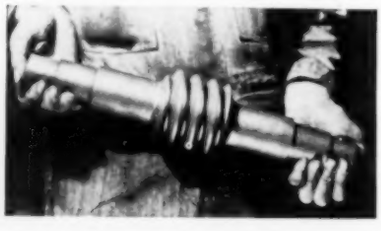
100% FORCED CONVECTION HEATING

AVAILABLE FOR TEMPERATURES TO 1750° F.

Triples production . . . keeps work straighter . . . less floor space

TYPICAL OF WHAT SUPER-CYCLONE 100% forced convection heating is doing to increase heat treating production and keep the work straight is the way it goes after this worm gear job. The worms are SAE 4140, weigh 20 lbs. each, and have a maximum section of 3". They are heat treated to 45 R. C. In the Super-Cyclone, 100 of the worms (a 2000 lb. load) are placed on the fixture as shown in the above photograph, heated in a 38" diameter x 60" deep Super-Cyclone and quenched on the fixture. Previous method was to heat in a radiation type box furnace. In the box furnace, having hearth dimensions 36" wide x 5' deep, a maximum of thirty worms could be loaded at once. Time to heat the thirty worms in the box furnace was 3½ to 4 hours. Time to heat the 100 worms in the Super-Cyclone is 4 hours.

PRODUCTION TRIPLED: Floor space requirements for the Super-Cyclone and the box furnace are the same, each requiring a space 8' x 11'. The box furnace turns out 7 or 8 worm gears per hour. The Super-Cyclone turns out 25 worms per hour, or looking at it another way, 160 pounds of work per hour as compared to 500 pounds of work per hour from the Super-Cyclone. A production increase of 300%.



HOW ABOUT STRAIGHTNESS? When the worms were hardened from the box furnace 85% went out between .015" and .025". Due to the high hardness of 45 R. C. straightening was extremely touchy. Straightening time per 100 worms required 8 hours time. When hardened from the Super-Cyclone, *90% of the worms required no straightening whatsoever,* and the balance was out a maximum of .010", easily taken care of in 30 minutes on the press. A reduction of 7½ hours in straightening time per 100 worms.

HANDLING REDUCED: Approximately 15 minutes were required for a man to load the box furnace. In quenching, three men handling the worms individually required 15 minutes time. A total of one man hour per 30 worms, or 3 man hours per 100 worms. Handling 100 worms in the Super-Cyclone required 15 minutes to load the fixture, 5 minutes to charge it into the furnace, 5 minutes for quenching, and 5 minutes to unload the fixture. This is a total of 30 minutes handling time per 100 worm gears or approximately 1/6 the time required for box furnace handling. It might be noted that the parts are drawn on the same fixture.

These savings are typical of what the new Super-Cyclone heating principle is doing in plants all over the country. And they are possible because 100% forced convection heating drives the heat through every part of the charge, heating every part accurately. Thus heavy loads are heated rapidly, distortion is eliminated or held to a closer range than is possible with conventional equipment. Handling is reduced so that each man in your heat treating department can turn out more work, and per unit of floor area the average Super-Cyclone installation turns out at least three times as much work as any other type of heating equipment available.

SUPER-CYCLONE FOR ANNEALING AND NORMALIZING

Heavy production in a small floor area

AT THE PLANT of a large midwestern appliance manufacturer, one Super-Cyclone 38" diameter x 48" deep anneals *twice* as many castings as the 8 box furnaces shown in the lower photograph. The Super-Cyclone requires a space 6' x 9'. The eight box furnaces occupied a space 36' x 9'. *Thus the one Super-Cyclone using but 1/6 the floor area actually doubled the production of the eight older furnaces,* or to put it another way: Super-Cyclone production was 12 times greater per unit of floor space than that of the older equipment. The reason for the Super-Cyclone's high production capacity is that the work is stacked up in the furnace, and the heat driven through the work, rather than having the work spread out over a wide hearth area to be heated by radiation.

SUPER-CYCLONE HAS WIDE RANGE OF USES

THE TEMPERATURE RANGE of the Super-Cyclone is 250° F. to 1750° F. with equal heating and control accuracy throughout the entire range. Thus it is a highly flexible unit for the small or medium heat treating department, as well as a heavy production unit for the large shop when put to work on one type of job.

Among the operations being handled by over 100 Super-Cyclones already in service are the following:

HARDENING: Typical of the Super-Cyclone's ability to turn out heavy production of touchy parts is the example shown on the opposite page.

ANNEALING: A large Wisconsin foundry is annealing and normalizing loads averaging 5,000 lbs. One Super-Cyclone 60" diameter x 48" deep turns out 17½ tons of work per day.

NORMALIZING: Because work can be stacked up densely, and quickly heated, The Super-Cyclone is an ideal furnace for normalizing.

TEMPERING: The Cyclone Principle of heating is well known to heat treaters for extremely accurate tempering under heavy production conditions. You can temper in the same furnace that you harden in with perfect heating accuracy for both operations.

NITRIDING: The Super-Cyclone fitted with a retort and cover does the same uniform job of nitriding as the standard Cyclone Nitriding Furnace. In addition, the temperature range of the Super-Cyclone enables the retort to be "cured" without removing from the furnace.

SPECIAL HEATING: Because work can be preheated at any desired rate—and cooled according to a definite schedule, the Super-Cyclone is well suited to stress relieving, spheroidizing, malleablizing and other heating operations requiring a specific cycle.

STANDARD SIZES IN WHICH THE SUPER CYCLONE IS AVAILABLE

Delivery time is speeded considerably when standard size furnaces are selected, rather than special sizes which must be drawn up. Drawings are available for the following sizes of Super Cyclones all of which have been built and are in operation. Most are gas fired, although a number are available electrically heated.

CHAMBER SIZE	CHAMBER SIZE	CHAMBER SIZE
16" diameter x 20" deep	28" diameter x 28" deep	38" diameter x 60" deep
22" diameter x 26" deep	28" diameter x 48" deep	43" diameter x 48" deep
22" diameter x 36" deep	28" diameter x 60" deep	48" diameter x 72" deep
25" diameter x 20" deep	33" diameter x 36" deep	60" diameter x 36" deep
25" diameter x 30" deep	33" diameter x 48" deep	60" diameter x 48" deep
25" diameter x 48" deep	38" diameter x 36" deep	60" diameter x 72" deep
	38" diameter x 48" deep	

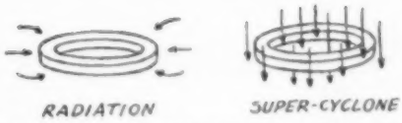
100 SUPER-CYCLONE INSTALLATIONS ALREADY IN SERVICE

IMPORTANT NOTE: Like all other Lindberg developments, the Super-Cyclone has been thoroughly proved under 24-hour a day production conditions for a minimum of 12-months before announcement to the trade. Every effort has been made to restrict the sale of these units until the probationary period was completed. In spite of this, however, many of those who have seen the furnace in operation during the past 18-months have quickly been aware of its production possibilities and requested that units be constructed for them. Thus, over 100-Super Cyclone installations are in service from coast to coast. One or more of these is near you, as is a Lindberg District Office, staffed by practical and competent sales engineers. The Super-Cyclone is not a cure all, nor do we represent it as such. It is speeding production, turning out straighter work, and cutting costs for many firms however, and we will be glad to survey its possibilities for you, on your work, at your request.

LINDBERG ENGINEERING CO., 2453 WEST HUBBARD ST., CHICAGO

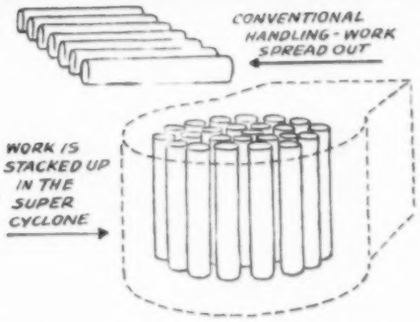
LINDBERG FURNACES

KEEPS RINGS ROUND



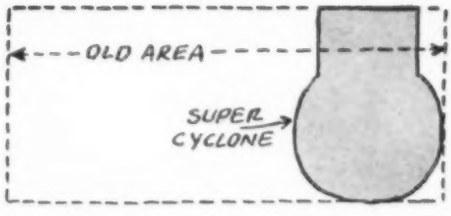
Rings, such as bearing races or ring gears, are allergic to "one-sided" heat. They go out of flat or out of round on the slightest provocation. That's why a large bearing manufacturer is enthusiastic about his first Super-Cyclone, and has ordered a second. In hardening rings 8" diameter x 3" high x 5/16" wall, quenching individually on jigs was formerly employed to hold the rings round. Now, 70 such rings are loaded onto the Super-Cyclone work fixture, heated and quenched all at the same time. The result: rings held well within the desired roundness, and heat treating time cut to ¼ of what it formerly was.

HEAVY LOADS ACCURATELY HEATED



You can easily verify the production increases possible through Super Cyclone Heating. Just spread an average load of your parts on the floor one layer thick as handled in a radiation heated furnace. Measure the area required. Then take those same parts and *stack them up* in a 36" or 48" circle, making allowance for spacers or supports. Figure it will take you a *maximum* of 3-hours to heat the piled up parts on a fixture. Five minutes to quench the lot. Ordinarily you will find production increase of from 200% to 1000% possible. Parts remain on fixture for quenching and tempering, a substantial saving in handling.

LESS FLOOR SPACE



Just measure the total floor space required to turn out your present production by your present methods. *As a very conservative thumb rule you can figure that the Super Cyclone will require not more than ⅓rd the floor area needed by any other type of equipment, to handle the same or greatly increased production.* The result . . . production increases of several hundred percent in present floor area . . . quick production increases without having to move or expand heat treat department area.

These thumb-rules are, of course, general and may not fit all cases. They are averages of what the Super-Cyclone has done in many plants. A Lindberg Representative can quickly and accurately give you any production figures, floor space layouts, or other information you may need.

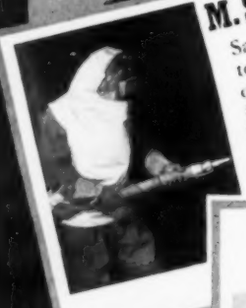
See the latest

DEVELOPMENTS IN FOUNDRY SAFETY EQUIPMENT

AT THE M·S·A EXHIBIT

BOOTHS 129-131

M.S.A. ABRASIVE MASK



Safe, comfortable, durable protection for shot or sandblast operators. Has gas-mask type facepiece under lightweight hood, "bump-proof" flow control valve, quick release connection, belt and optional air filter. Weighs less than 4 lbs. **Bulletin No. CS-3.**

M.S.A. MIDGET IMPINGER

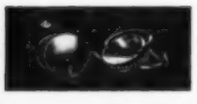
A portable instrument for quick, dependable dust sampling, the Midget Impinger is self-contained and hand operated, employing no wires or other external connections. Weighs less than 10 lbs.; samples at rate of one-tenth cubic foot per minute. **Bulletin No. CT-5.**

M.S.A. DUSTFOE RESPIRATOR

U. S. Bureau of Mines-approved protection against all foundry dusts; light and compact—weighs only 3¾ ounces; deep facepiece snugly fits facial contours. Simple, foolproof exhalation valve. **Bulletin No. CM-5.**

M.S.A. WELDER'S SHIELD

The finest welding protection available. Equipped with adjustable knob-control headgear. **Bulletin No. CE-10.**



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Eye protection for every job! Many styles and sizes of easy-fitting eye safeguards. **Bulletin No. CE-8.**

COMFO METAL FUME RESPIRATOR

Offers safe protection against toxic fumes from heated or molten metals, particularly lead fumes encountered in lead burning, welding, etc., in foundry work. Compact and snug-fitting. No interference with any head covering. **Bulletin No. CR-6.**

M.S.A. FIRST AID KITS

M.S.A. offers a complete line of First Aid Kits and supplies, including the illustrated Foille Burn Spray Kit. Ready-to-use assortments of essential first aid dressings and treatments are unit-packed in dust- and moisture-proof, strong steel cases. 10-, 16-, 24- and 36-unit sizes. Stretchers and stretcher outfits are also available. **Write for Bulletins.**

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For every foundry job, M.S.A. has a line of protective clothing including complete suits, coats, aprons, sleeves, leggings and gloves. Many types of M.S.A. gloves offer hand protection for every foundry requirement. **Write for descriptive Bulletins.**

MINE SAFETY APPLIANCES CO.

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District Representatives in Principal Cities

AS THE TWIG IS BENT . . . . .

EWING GALLOWAY PHOTO

Corpus Christi Day in Southern Mexico turns out such little pilgrims as these tiny tots dressed as Indian peons—yet such an assemblage as these are rare in comparison to the vast number of poorly clad and under-educated children of the State . . . Casting results in the gray iron foundry are likewise reflective of the manner in which the "twig is bent". Hardness reduction resulting in smoother and more easily machined surfaces of your castings starts at the beginning (as with the kid's life). A few pounds of prevention (No. 8 Mexican Graphite) added to your molten iron as it flows down the spout into the initial receiver will affect castings of softer base metal—reducing machining time and adding to the tool life in your customers' shops.

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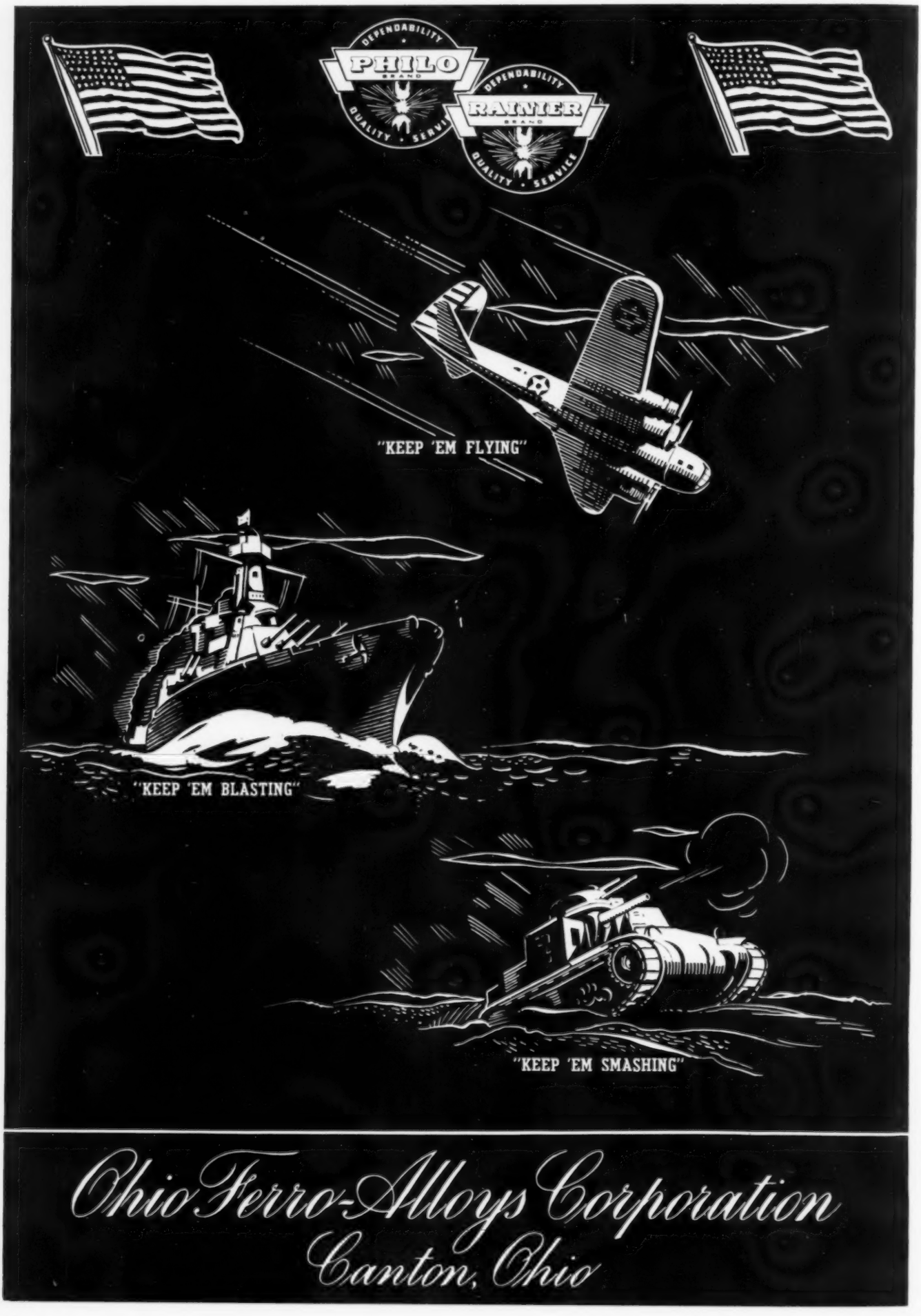
NO. 8 MEXICAN GRAPHITE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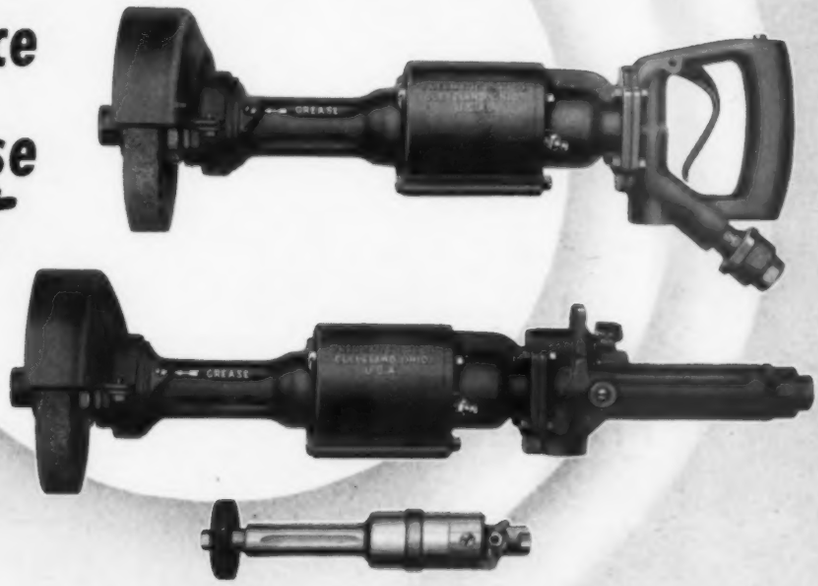
CLECO Rotary GRINDERS

give better service because of these Important features



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PRECISION CONSTRUCTION. All Cleco Grinders have alloy steel rotors and cylinders, heat-treated and then ground to exact size, thus insuring smooth, vibrationless operation at all speeds. The highest grade ball bearings are used throughout.

RUGGED DESIGN. The one-piece casting, extending around the spindle and including the cylinder, plus the use of through bolts to hold the handle, provides the utmost in durability. Improved governor design prevents metal-to-metal contact, thus eliminating wear or binding. Cleco Tools are completely rust-proof.

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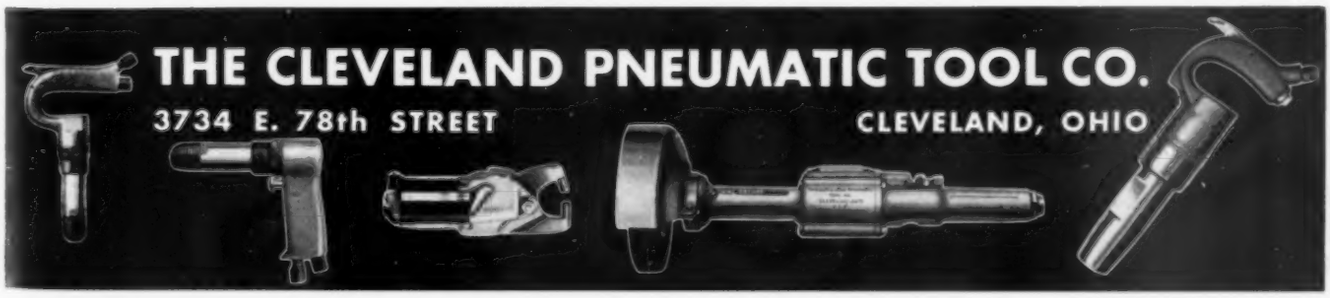
Write for Bulletin 80 that fully describes Cleco Grinders and includes a large blueprint of construction details. Bulletin 75A gives all the essential information on the extensive line of Cleco Chipping Hammers. For Bench and Floor Rammers, you will want to consult Bulletin 76A. All Cleco Tools are available on free trial. No obligation.

Branch Offices in All the Principal Cities



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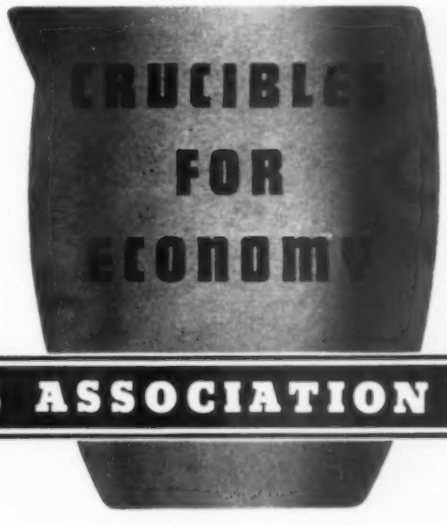
2. Store crucibles in a dry warm place.
3. For the first heat follow the instructions of the manufacturer of the particular type of crucible you are using.
4. Charge ingots or long pieces so they will not wedge and rupture the crucible when expanding.
5. Empty the crucible on the last heat of the day.
6. Be careful in the use of stirrers or pokers for coke fires.
7. If you use coke fires avoid pinching coke between tong blades and crucible: scrape coke from bottom of crucible before setting down in shanks.
8. If oil or gas are used keep proper ratio of fuel and air; the flame should be neutral or only slightly oxidizing or reducing.

FOR COMPLETE AND DETAILED INSTRUCTIONS WRITE FOR BOOKLET TO THE ADDRESS BELOW



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These men are devoting their entire time to laboratory research, to studying the reports of other scientific investigations, to visiting manufacturing plants throughout the United States, and to classifying and summarizing a mass of information having practical value. They have had broad experience relating to foundry practice and especially to foundry sand problems. They have helped hundreds of foundries of all types solve a variety of difficulties. Perhaps they can assist you. There is no charge for their service.

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at the

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Bentonite enables you to get nearer to perfection . . . to get greater uniformity, cleaner castings, fewer rejections. Less sand is required and costs are reduced. You are practically assured of success because Bentonite is always sold with a complete technical service fitted to your individual needs.

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Moline, Ill.	Midwest Foundry Supply Co.
New Orleans, La.	Barada & Page, Inc.
Oklahoma City, Okla.	Barada & Page, Inc.
Philadelphia, Pa.	Penn. Fdy. Sup. & Sand Co.
Portland, Ore.	Miller & Zehrung Chemical Co.
St. Louis, Mo.	Midwest Foundry Supply Co.
San Francisco, Cal.	Industrial Supply Co.
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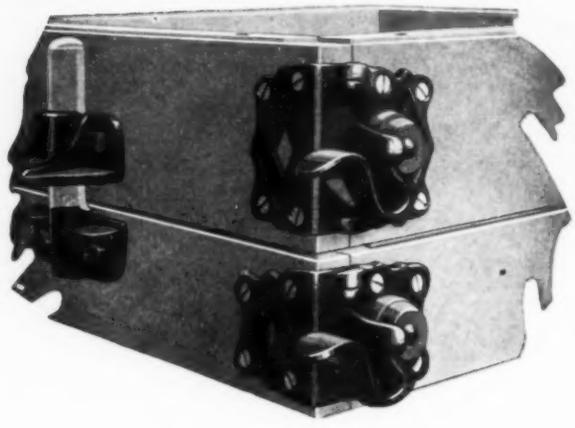
Write for New BENTONITE HANDBOOK

This reference book explains the origin and advantages of Bentonite . . . how to use it in connection with numerous sand mixtures. Just ask for it on your letterhead.

AND PRACTICAL ADVISORY SERVICE . . .

A *Real* INVESTMENT FOR MORE PRODUCTION!

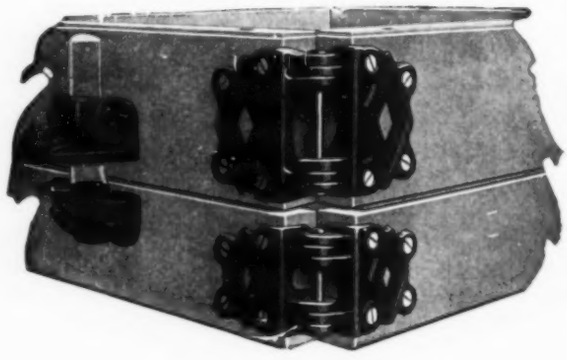


DIAMOND FLASKS

No matter what happens—you'll never be wrong if you equip for production with *good* flasks. Because we can give you many exclusive features in a flask developed over a period of 50 years, it can also be said that, "You can't go wrong on a Diamond," either. Note these important features:

- **A SUPERIOR LATCH (exclusive)**

  It's self-compensating for wear. The tighter you draw it, the firmer the grip. Has special cam which is easily adjustable as extreme wear on parts develops. Only *Diamond* has this patented feature.



- **PRECISION-MADE**

  Made from the finest grade of well-seasoned cherry stock, all flasks are made to precise measurements according to your specifications.

- **A PATENTED HINGE (exclusive)**

  Note the construction of Diamond hinges. The lugs are carefully milled and are interlocking which eliminates "play" no matter how long or how hard the flask is used.

- **SPECIAL SHAPES**

  We regularly supply customers with special shape flasks, including round flasks, and special cut partings.

STEEL JACKETS

Made from Nos. 7 to 10 gauge steel, true to size and taper. Are practically indestructible, and retain their shape under severest conditions. Thousands of these jackets in use.

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CLAMP AND FLASK COMPANY

Telephone 2553 **Richmond, Indiana**

Designers of* CORE PLATES, JACKETS, BANDS, FLASKS *since 1889

HOTTER IRON - - - -
BETTER CONTROL
And
A SAVING OF $1,000 A YEAR IN COKE!

with the
I-R CUPOLA
MOTOR BLOWER
at
T. SHRIVER & COMPANY
HARRISON, N. J.

This 40-hp Type FS Motorblower delivers 4400 cfm to cupolas in the T. Shriver & Company foundry.

A Statement by T. Shriver & Co.—

"Many of the castings for our filter presses are fairly difficult to make. The higher spout temperatures and the uniformly hot iron we now obtain with controlled blast have helped to improve our foundry practice.

"In installing the new equipment we were primarily interested in better control of the cupola, and hence of the products of the foundry. We are nevertheless pleased to note that by raising the iron to coke ratio from 8½:1 to 9½:1 *we are saving some 600 pounds of coke daily.* At current coke prices, this amounts to well over $1000 saved in a 300-day year."

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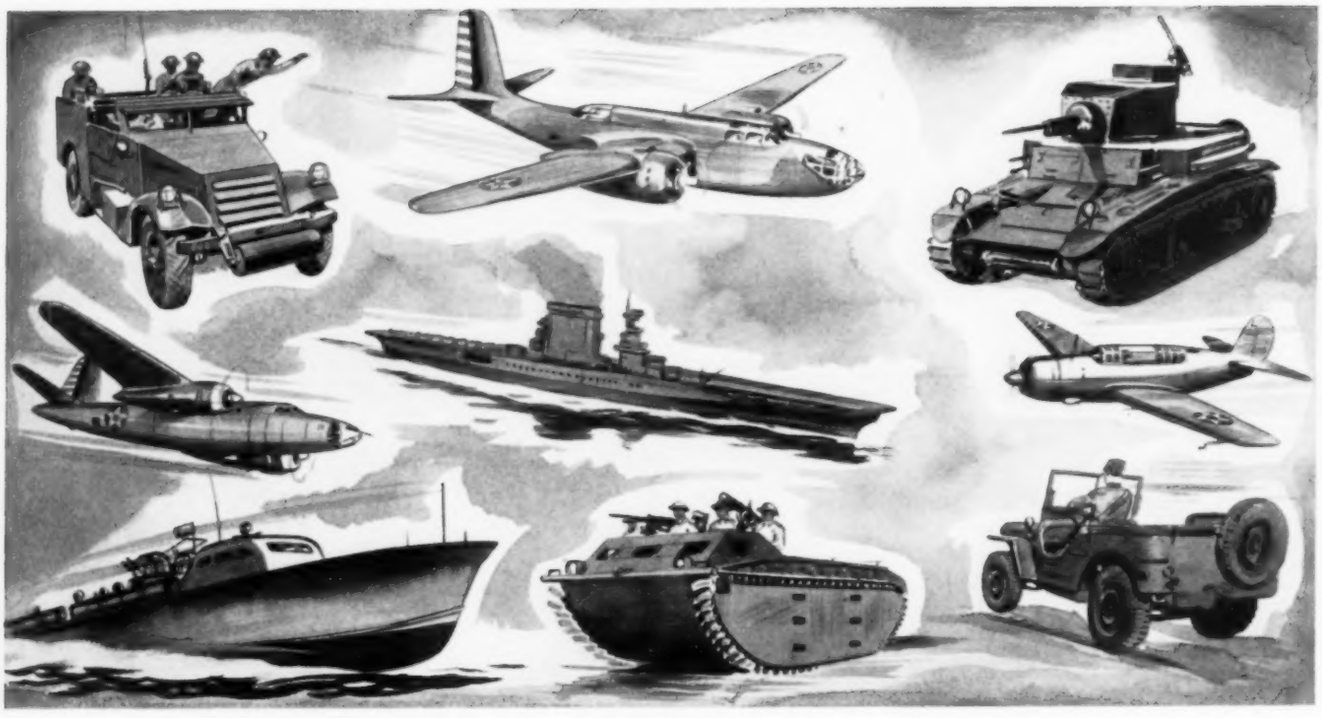

Enlisted For The Duration . . .

Twenty-four hours each day, the Lavin plants are running full speed ahead on production of Aluminum, Brass and Bronze ingot—to be fabricated by the Foundry Industry into parts for Naval Craft, Warplanes, Tanks and Bombs.

Each step in this production is planned, and founded on Scientific Research—so that Government Specifications are meticulously met—both *chemical* and *physical*.

When vital parts of armament are cast or fabricated from Lavin Aluminum, Brass, or Bronze ingot, one thing is certain—that such parts will function perfectly and be ready at all times to meet the supreme test in combat.

Our Laboratories, staffed with metallurgists and foundry engineers, are at the foundrymen's service night and day to help with any production problem that will aid the Defense Program.

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PATTERN PLATES
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Our STEEL plates are built for high gear foundry production. And ten years from now they will be just as good. Let us know your requirements?

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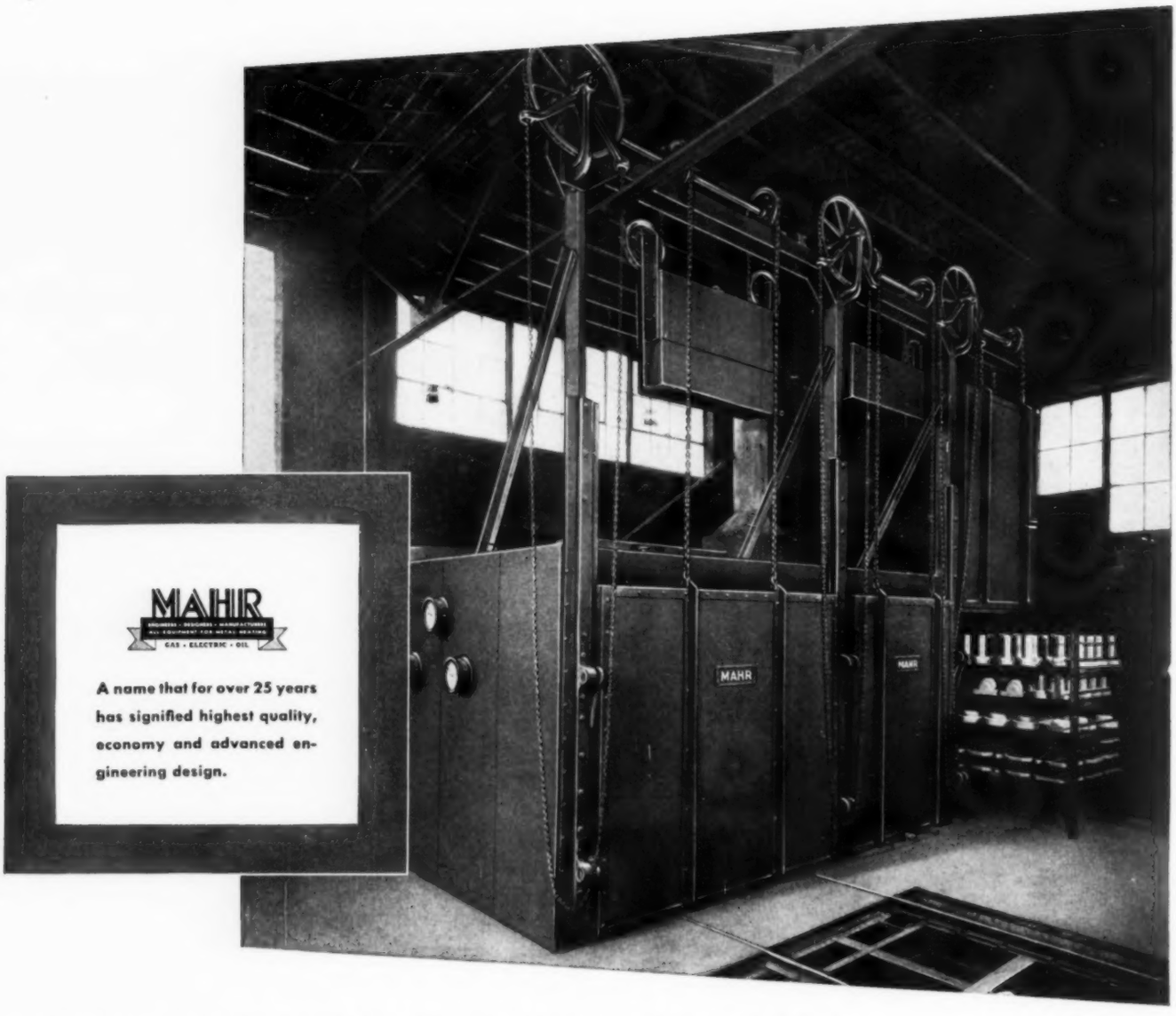
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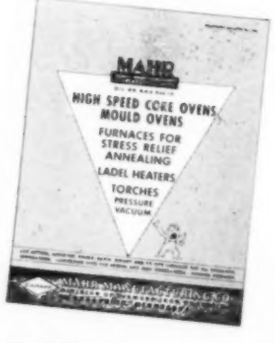
GAS • ELECTRIC • OIL
A name that for over 25 years has signified highest quality, economy and advanced engineering design.

ASK FOR YOUR COPY OF THIS new BOOK

At the very foundations of our victory program stand the foundries of America. From them must flow, rapidly and continuously, the millions of castings needed for the tools of this war . . . Just off the press, this new MAHR Bulletin No. 750 tells the intimate and complete story of the ovens, furnaces, ladle dryers, torches etc. that play such an important part in the production of any good foundry. *Ask today!*



MAHR is making exceptionally prompt deliveries under unusual conditions. Ask about them.

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DIVISION OF DIAMOND IRON WORKS, INC.

MINNEAPOLIS, MINNESOTA, U. S. A.

Continuous service in Allied war production

FOR ACCURACY!

PROCESSING • DESIGNING • ENGINEERING
TOOLS • DIES • FIXTURES • GAGES
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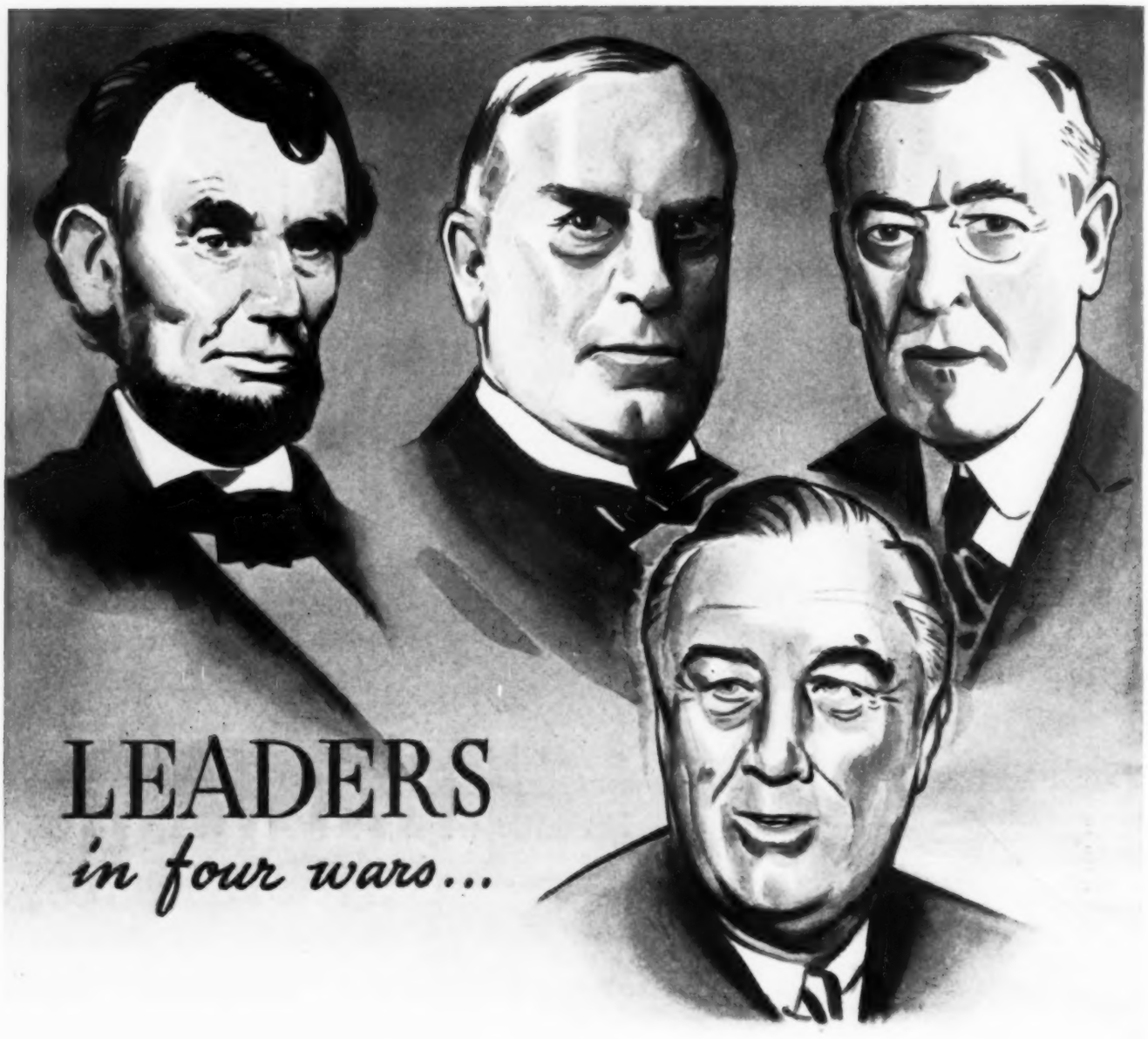


and Globe irons have been leaders in these four wars, too...

Thomas E. Jones, Agent, great-grandfather of the active president of this company, was a firm believer in the destiny of the United States. The charcoal pig iron he made back in the days of the "Buckeye" and "Jefferson" furnaces was this company's first contribution to national defense: it went into armor plate, guns, wheels, cannon balls and other durable castings required by the Union Army.

Through each succeeding war, including the present conflict, we have tried to better our quality of iron to meet higher demands. In this war, our SILVERY PIG IRONS and other specialties are being used from armor plate to high grade gray iron and steel castings.

Abraham Lincoln, William McKinley, Woodrow Wilson and Franklin D. Roosevelt will go down in history as leaders of a nation shaken by wars, but the Globe Iron Co. does not expect a great deal of public recognition. This company is content to manufacture superior irons, styled to pass the most rigid specifications, and designed to play a vital part in national defense.

GLOBE IRON CO.

JACKSON, OHIO

RANSOHOFF
Equipment

is giving uninterrupted service in many of the nation's leading foundries as its part in the Victory Program—cleaning castings faster, more thoroughly and more economically.

We are on the job, constantly, devoting our time, facilities and personnel, making better cleaning machinery and speeding up production.

Consult Ransohoff Engineers for information concerning your castings cleaning problems; there is no obligation.

You, too, can derive the benefits of low cost and better cleaning of castings through the use of Ransohoff Equipment.

Write or wire Dept. "F" today for further information, or see us at the show

N. RANSOHOFF, INC.
CINCINNATI **OHIO**

GEHNRICH INTEGRAL CONVECTION HEATING MEANS HIGH SPEED— MORE UNIFORM CORE BAKING

A 150 ton load of molds in this large "IC" lift door oven — yet uniform heat distribution and recirculation dry the heavy mass with minimum fuel.

This patented Gehnrich Corp. development integrates the heater, using any fuel, with the oven chamber and provides heat distribution, recirculation and operating improvement that results in

BETTER CORE QUALITY

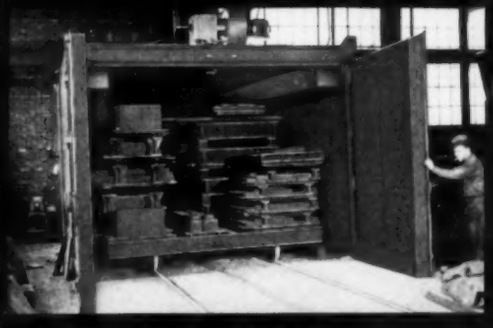
No matter how heavy the load or how variable the core size and its location in the oven, the uniform rate of moisture removal and drying by convection, produces stronger, harder cores, without skin drying or burning.

RECIRCULATION SAVES HEAT

Moving large volumes of heated air at controlled temperature and frequent recirculation reduce baking time and fuel consumed.

SAVES SPACE—CUTS COSTS

Combining the external heater with the Gehnrich Corp. Dual Panel oven in one unit produces greater compactness, efficiency and low cost construction that saves space, equipment and heat loss.



Another large "IC" oven with oil fired heater section in rear, drying a car load of large and small molds.

Dozens of these installations prove the outstanding performance economy of Gehnrich Corp. T Type "IC" Core and Mold Ovens. We'll be glad to send you a list of users—get their opinions. Write for Catalog No. 108.

THE GEHNRICH CORPORATION
42-11 35th Street, Long Island City, N.Y.

Two compartment, recirculating "IC" oven, heated by single "IC" heater, baking large and small cores and molds uniformly.

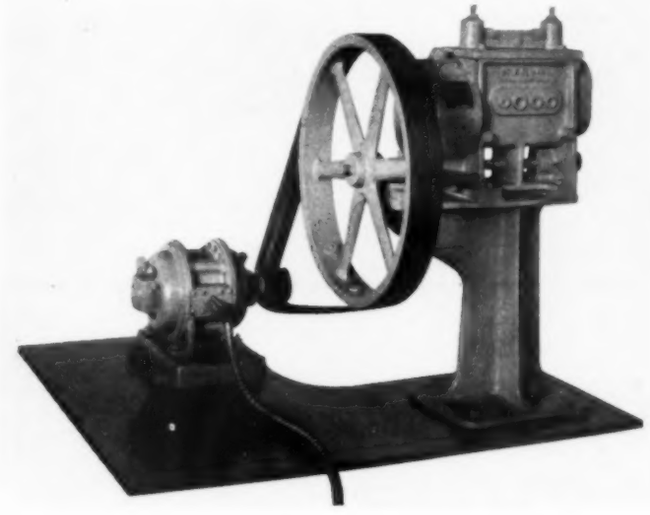
Three compartment oven with power operated lift doors.

GEHNRICH INTEGRAL CONVECTION CORE OVENS

TWO WAYS TO AVOID "Priority Paralysis"

● With core wires becoming constantly harder to obtain, an ever-increasing number of foundries are turning to the Climax Wire Straightener as their answer to this problem. The two new direct-drive units shown below are ready to operate almost the instant they are received.

Peace-time tie-ups are bad; war-time tie-ups are much worse. If you have a hard time keeping your core room in wires, you'll be interested in the two solutions shown below. Read about them now and write for complete information today.



SOLUTION NO. 1—If your core wires are ¼" and smaller, the No. 2-A Climax Wire Straightener shown at the left will ease your problem.

The No. 2-A Climax with V-belt drive is a compact unit requiring only 14.7 square feet of floor space. The V-belt drive provides enough flexibility to eliminate shock-loads on the motor.

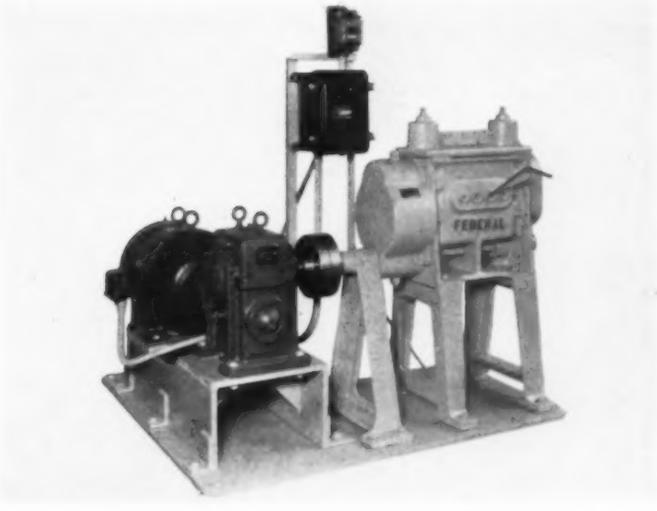
This model can be furnished with remote control reversible switch and motor if desired. Motor required is a 3 H. P., 1200 R.P.M.

Write for further details now.

SOLUTION NO. 2—Shown at the right is the larger No. 2½-A Climax Wire Straightener with gear-reducer and motor. This unit handles any four sizes of wire from 3/16" to ½" inclusive.

The remote control switch is conveniently located at the front of the machine. Flexible couplings and overload protection on the reversible switch make the No. 2½-A Climax fool-proof. Required floor space is only 24.7 square feet.

The No. 2½-A can be furnished with or without the motor which is a 5 H. P., 900 R.P.M. Write for a quotation today.



★ *A larger Model (No. 3A) is available with gear reducer also* ★

THE FEDERAL FOUNDRY SUPPLY CO.

4600 EAST 71st STREET, CLEVELAND, OHIO

CHICAGO—CHARLEROI, PA.—CHATTANOOGA, TENN.—DETROIT—MILWAUKEE—MINNEAPOLIS—NEW YORK—RICHMOND, VA.—ST. LOUIS—UPTON, WYO.

AT OUR BOOTH

NO. 261, 263 and 265

Please consider this a warm invitation to stop in our booth at the American Foundrymen's Association convention, Cleveland, April 20-24. Arrange to meet your friends there. Make it a place to settle down for a few minutes relaxation. » » You will be free to browse through books from our industrial library; you may enjoy looking through interesting old bound volumes of The FOUNDRY; or you can just rest your feet. Come in . . . we will be very glad to see you.

THE FOUNDRY

PENTON BUILDING CLEVELAND, OHIO

NEW TUNNEL KILN GIVES BAY STATE INCREASED CAPACITY

ANOTHER CAR ROLLS IN!

...Yes, and soon out of BAY STATE's new continuous tunnel kiln will come more highest quality grinding wheels for the vital war production of America.

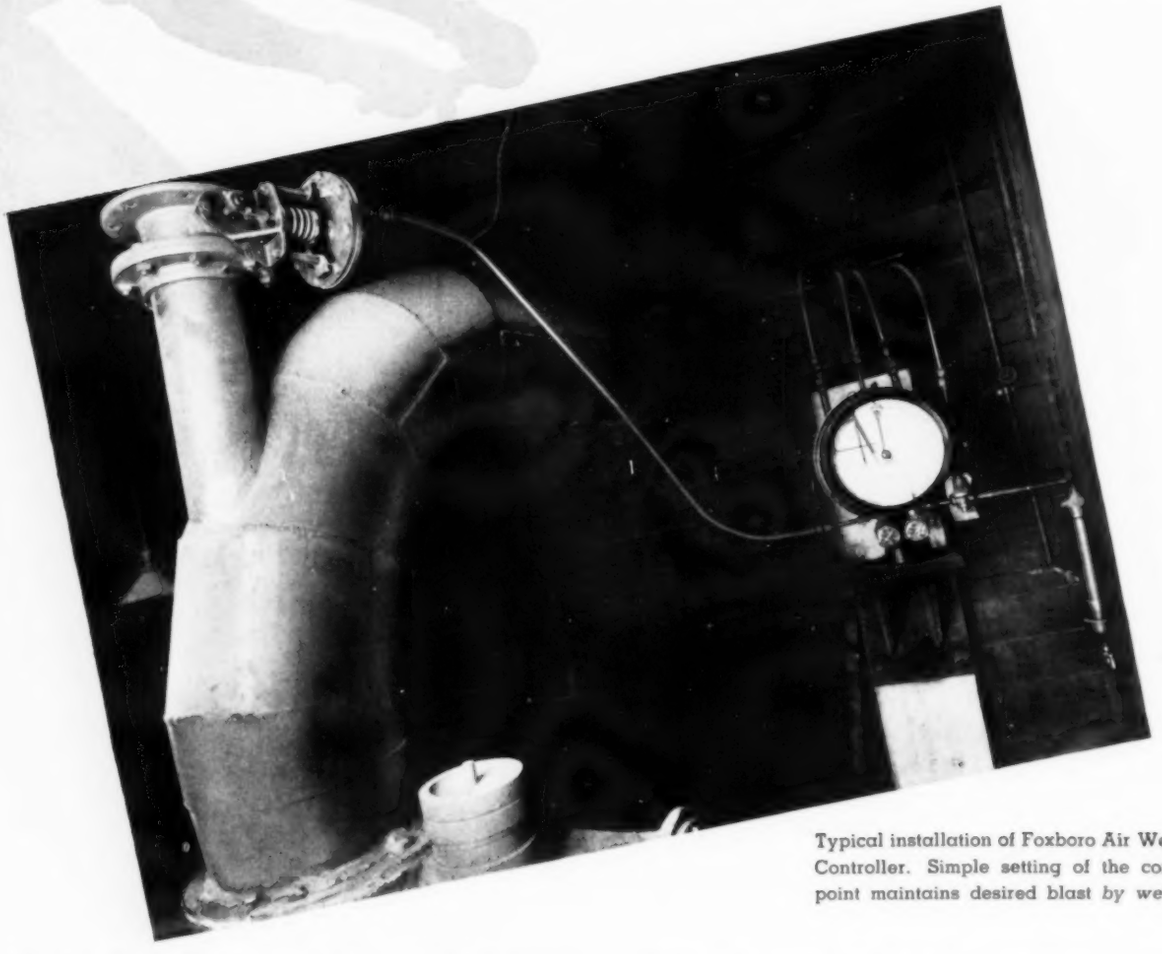
With this increased kiln capacity BAY STATE is now prepared more than ever to offer greater production, quicker deliveries and more accurate grade control of all types of vitrified bonded abrasive products.

Emblem of BUSINESS CHARACTER
Rice Leaders of the World Association
Represents High Standing in NAME - PRODUCT - POLICY

BAY STATE ABRASIVE PRODUCTS CO.
WESTBORO, MASSACHUSETTS, U. S. A.

This "Phantom Foundryman"

INCREASES FOUNDRY OUTPUT!



Typical installation of Foxboro Air Weight Controller. Simple setting of the control point maintains desired blast *by weight.*

Easily-installed Foxboro Controller keeps heats uniform and hotter . . . eliminates pigging and rejects

A simple installation makes any cupola produce added tonnage of good castings per day. All that is needed is Foxboro Air Weight Control equipment on the blast line!

This "phantom foundryman" automatically controls the blast to supply a constant *weight* of air per minute, regardless of wind-box pressure, atmospheric temperature or barometric pressure. It makes *every* day a "good pouring day"!

You'll get consistently better melting . . . hotter heats without burning . . . uniform pouring conditions that prevent faulty castings and eliminate need for pigging.

Write for Bulletin B-268 on Foxboro Air Weight Controllers, or detailed information on other Foxboro Instruments for metal industries. The "Phantom Foundryman" is only one example of Foxboro's Creative Instrumentation that can boost output, cut costs and save maintenance in wartime plants. **The Foxboro Company, 32 Neponset Ave., Foxboro, Massachusetts, U. S. A.** Branch offices in principal cities of the United States and Canada.

— RECORDING · CONTROLLING · INDICATING —

FOXBORO
REG. U. S. PAT. OFF.
Instrumentation

Buckeye Silica Firestone

A·F·A
WELCOME

We extend a cordial invitation to foundrymen and others interested to visit our booth at the American Foundrymen's Convention, Cleveland, April 20-24. We will be located in Booth Numbers 331-337 inclusive Aisle No. 2 in Hall No. 4. (The upper section of lower level)

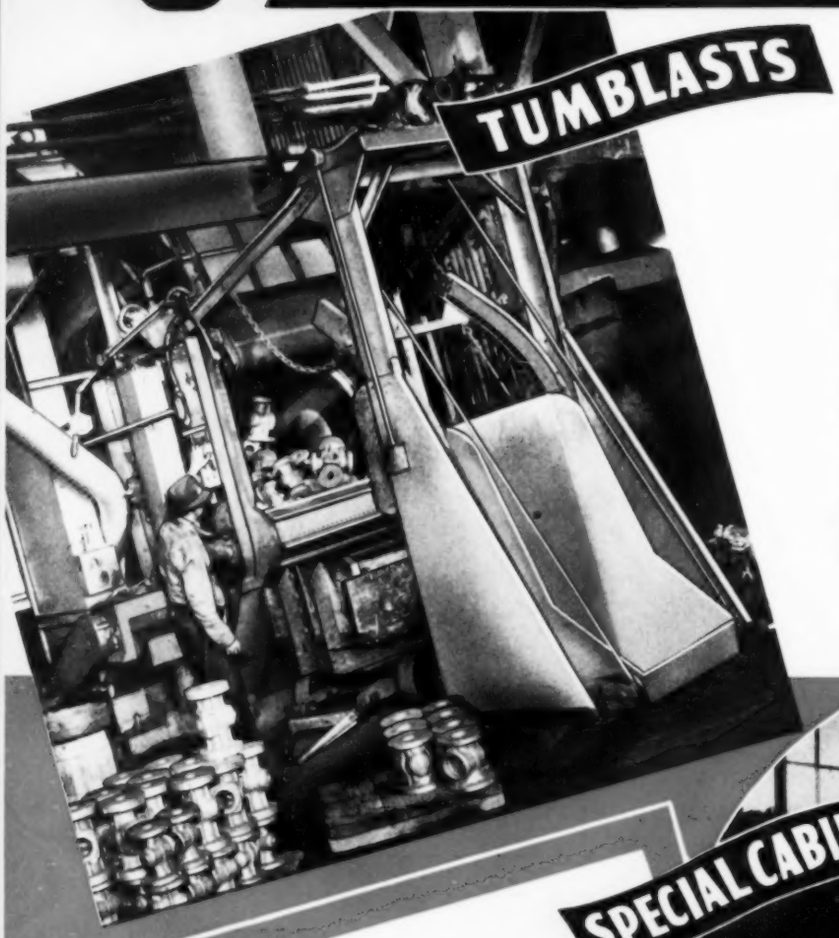
You will be heartily welcomed at our South Amherst Quarries on Route 59, 9 miles west of Elyria, Ohio, on the direct route between Cleveland and Chicago. Drop in and see stone quarried from these vast silica deposits, the largest in the world; see it sawed, planed and otherwise fabricated in our mills.

The Cleveland Quarries Co.

REFRACTORIES DIVISION

BUILDERS-EXCHANGE BLDG. CLEVELAND, OHIO

3 PROFITABLE WAYS TO CLEAN CASTINGS



TUMBLASTS

WHEELABRATOR Tumblasts combine the airless WHEELABRATOR method of speed-cleaning with the endless conveyor method of tumbling—an exclusive American principle—which completely exposes all surfaces of every piece to the full effect of the abrasive blast.

Tumblasts are built in seven standard sizes ranging from 1 cu. ft. to more than 30 cu. ft. operating load capacity. Automatic loaders can be supplied for all but the very smallest sizes.

These machines are widely used in the foundry industry for cleaning gray iron, malleable, steel, and non-ferrous castings of an almost unlimited variety.

SPECIAL CABINETS

WHEELABRATOR Special Cabinets have the distinction of being used for an exceptionally large variety of special cleaning problems in the foundry industry. They are designed for handling work where special production requirements prevail, or where the work, due to its size, shape, or weight cannot be adapted to a standard machine; such as cylinder blocks, sanitary ware, etc.

Special Cabinets utilize the WHEELABRATOR in single or multiple units. Special means are used to convey the work through the blasting zone. Certain classes of work are given a rolling, tipping or spinning motion during the blasting process to expose them to the full effect of the abrasive blast.

IN RECORD TIME

IN this critical period of our history there is no substitute for production speed—to create more guns, more tanks, more planes, more of all war material—that we may preserve the Liberty we cherish, our priceless heritage.

WHEELABRATOR speed-cleaning is doing its share to speed the day of Victory by saving thousands of hours every day on vital defense jobs—shells, bombs, tank parts, airplane engines, guns and similar products almost without number.

And further savings in time and money accrue by reason of the quality of WHEELABRATOR cleaning: For example, machining and grinding are speeded up; cutting tools last longer, and inspection is handled more rapidly.

When there is a casting cleaning job to be done you can depend upon the WHEELABRATOR to handle it in record time. And there are 3 Profitable Ways to do it, as described in brief on these pages.

Do you know that ...

A WHEELABRATOR Tablast is cleaning brass valves and lubricators so thoroughly for a Detroit, Mich., concern that savings exceeding $10,000 yearly in tool life alone are anticipated.

★

Steel castings weighing up to 3,000 lbs. and up to 60" in diameter are being cleaned on a special WHEELABRATOR Tablast at Unitcast Corp., Toledo, Ohio.

★

When the Defiance Machine Works, Inc., Defiance, Ohio, installed their WHEELABRATOR Tablast they eliminated four tumbling mills, reduced Sandblast room time by 60% and increased their production capacity with ⅓ of former floor space.

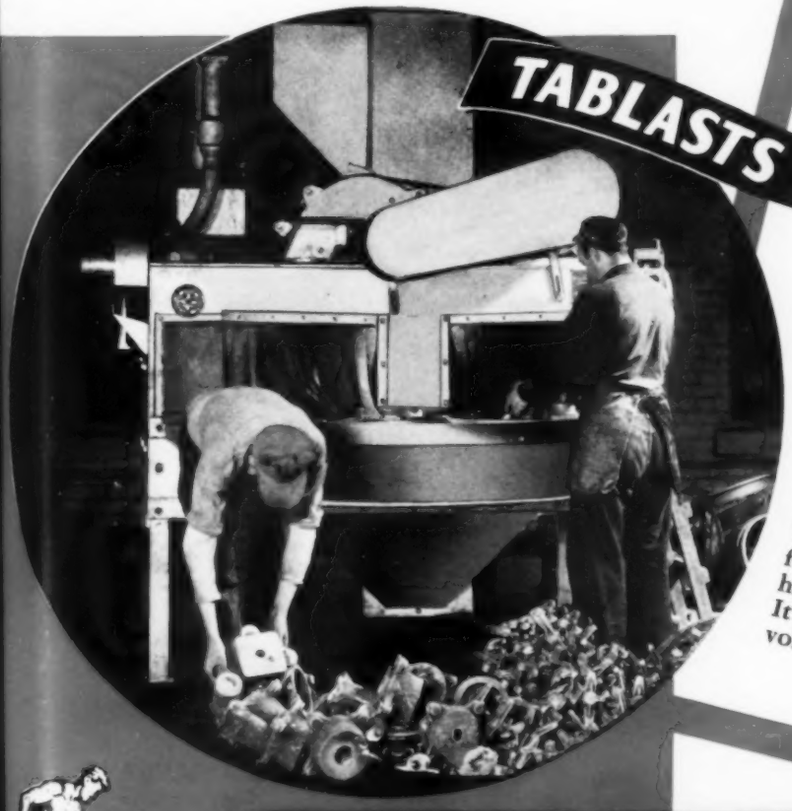
★

The ability of the 48" x 48" WHEELABRATOR Tumblast to stand the gaff of heavy production is demonstrated by the fact that it is used by more than 40 steel foundries.

★

The 15" x 20" WHEELABRATOR Tumblast is ideal for shops having a limited production of relatively small pieces to clean, such as in the small foundry or in the small department of a large industry.

★



TABLASTS

WHEELABRATOR Tablasts are used for cleaning flat or fragile work that is not adapted to tumbling. They are made in two types: The Multi-Tablast and the Plain Tablast.

The Multi-Tablast is recommended for work having high vertical edges or deep pockets which must be cleaned or prepared. It consists of independent rubber-covered work tables, the number and diameter of which can be varied according to the type and size of work to be cleaned. The tables automatically revolve as they approach the WHEELABRATOR blasting zone and continue to do so until they leave its field.

The Plain Tablast is suitable for jobbing foundries having work that does not have too many pockets and vertical edges. It has a single work table, which revolves on a central spindle.

AMERICAN FOUNDRY EQUIPMENT CO.

505 S. BYRKIT STREET · MISHAWAKA, INDIANA

TO SWELL THE FLOW OF *Production for Victory*

Castings and more castings—thousands and thousands of tons of them—are needed in *Production for Victory.* The American Foundry Industry will provide them—sound, flawless castings on a regular high-speed basis of output. And Republic—producer of the most complete line of merchant iron available—is cooperating with our Government in supplying iron to the foundry industry.

To help swell the flood of wartime production, Republic also is supplying something more than iron—the services of the Republic Pig Iron Metallurgist—the man who has built a nation-wide reputation for being "always at your elbow" when you need him.

He's a technically-trained metallurgist—but he's also a practical foundryman who knows foundry operations forward and backward. He's just the man to call on when changeovers to wartime items must be made—when difficulties arise—when output is not as high as it should be.

Ask us to send him wherever and whenever you need him.

REPUBLIC STEEL CORPORATION
General Offices: Cleveland, Ohio

Berger Manufacturing Division • Culvert Division
Niles Steel Products Division • Steel and Tubes Division
Union Drawn Steel Division • Truscon Steel Company

REPUBLIC STEEL — PRODUCTION FOR VICTORY

Republic

PIG IRON

"CHATEAUGAY"
Low-Phosphorus Copper-Free

"REPUBLIC"
(Northern)
Foundry, Basic and Malleable

"PIONEER"
(Southern)
Foundry and Basic

ALSO TRUSCON FOUNDRY FLASKS · REPUBLIC CORE WIRE · FOUNDRY NAILS

United Nations Need More Castings To Meet Production Goal

THIS WAR cannot be won without castings. Unless the foundries of America provide an adequate supply of quality cast products in steel, gray iron, malleable iron, aluminum, magnesium, brass and bronze, the United Nations will not have the necessary materiel to achieve victory. Castings must be produced in much larger quantities for airplanes, tanks, ships, guns, shell, bombs, machine tools and practically all other types of machinery, railway cars, locomotives, trucks, and every other urgent requirement of war. When appraised calmly in the light of today's demands and tomorrow's probable needs, the responsibility resting upon the foundry industry is tremendous, for castings are basic to production for war.

To an industry faced with this great obligation, the annual convention and exhibition of the American Foundrymen's Association, to be held in Cleveland, April 20 to 24, offers unusual opportunities. Problems of production, conversion, procurement, plant protection, to name only a few, may be studied at first hand, and through the exchange of information and experiences, production of castings for war may be speeded. Consideration of several convention activities should indicate possibilities for service to the war effort which will be provided by the Cleveland meeting.

Technical meetings, which include formal papers, roundtable discussions, and shop operation courses, will review progress of the past year in practice and product, and will indicate trends which developments may take during the coming year. Types of materials needed for war are changing constantly as experience of one campaign is utilized in preparation for future battles. This is well illustrated in the progress of tank construction, where the early types, fabricated of riveted plate, have been redesigned in a series of steps until the latest model is built almost entirely of steel castings. As in many other developments, use of cast armor plate has created many technical problems relating to design, production, and heat treatment. Through research activities of individual companies and the co-operative efforts of technical groups, these ever growing problems of practice and product may be solved as they arise.

This year the foundry show will bring to convention visitors the latest information on methods now being used to meet production demands. Representatives of companies manufacturing equipment and supplies will be able to give advice on the types of equipment best adapted to war production in foundries. Government officials will provide authentic information on steps which must be followed in procuring raw materials, supplies, and foundry equipment, and this feature will be augmented by several general meetings dealing with war production problems. The government, as well as a number of individual firms, are co-operating in an exhibit of castings now employed in the war. In addition to the enthusiasm engendered by pride of achievement, this special display should indicate possibilities of conversion on the part of foundries which as yet have not been able to secure war work. Government requirements are highly specialized, and not all shops have the facilities to produce the types of castings needed at present. These require special study.

Plant protection is a pressing problem, especially as it pertains to fire, sabotage and air raids, and foundry management must take every possible precaution against plant damage from any cause. One of the most important sessions at Cleveland will feature a discussion of the recently prepared report of the association committee on plant defense and protection. Proper attention to plant protection may avoid considerable embarrassment to management and costly delays in the production of vital materials.

The foundry industry gathers at Cleveland on a most serious mission. Complete co operation of all of those who participate should make possible greater output from the hundreds of foundries now engaged in war production, and the early conversion of the remainder shops to that most important cause.

Frank G. Steinebach

Editor

Speeding War

is theme of A·F·A

CLEVE

Production

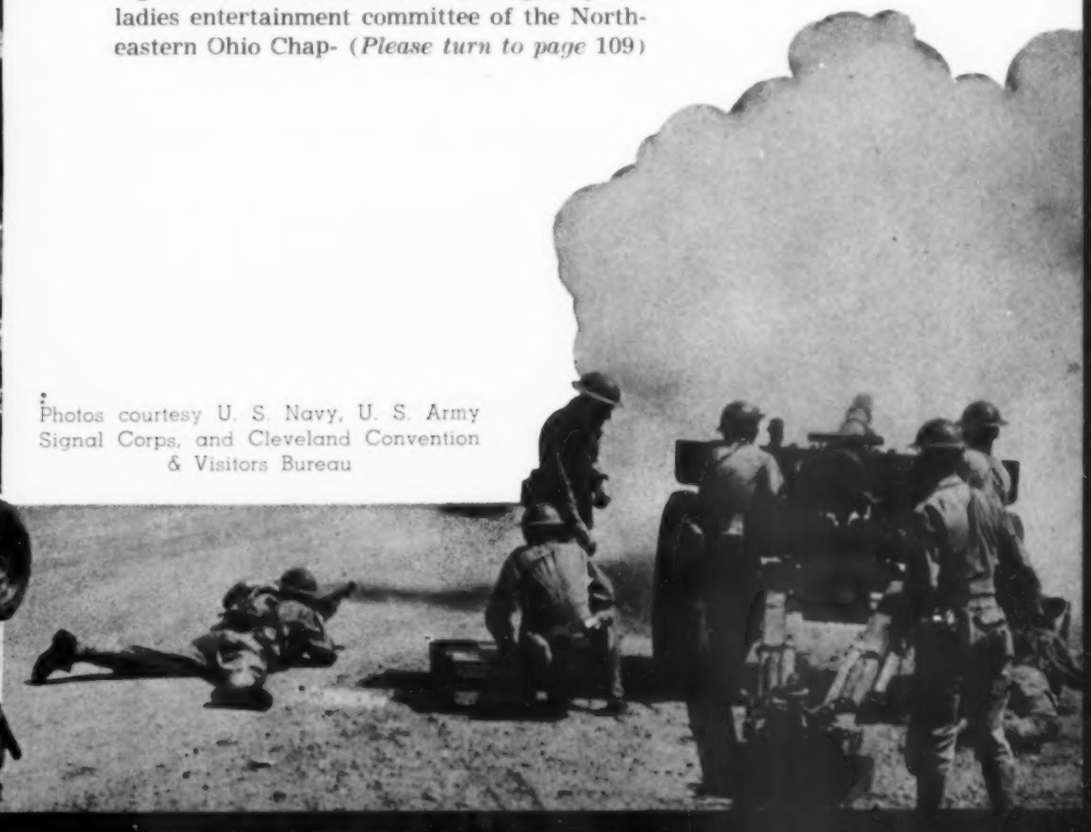
convention in

LAND

WITH American industry engaged in the greatest production effort of all time, problems of speeding the output of castings for machines of war undoubtedly will feature all activities of the 1st Western Hemisphere Foundry Congress and the Foundry and Allied Industries Show to be held in Cleveland, April 20 to 24 in conjunction with the 46th Annual Convention of the American Foundrymen's Association. Ways and means of meeting present heavy demands for many types of castings used in war, and methods of converting all available foundry capacity to war production will be stressed at the various technical sessions, round-table discussions, shop courses and other meetings, and will be the theme of the exhibition of foundry equipment and supplies and the display of ordnance materiel. Representatives of the War Production Board and other government agencies will be present for consultation on problems of procurement and war regulations.

The association is meeting in Cleveland upon the invitation of the Northeastern Ohio Chapter of the American Foundrymen's Association. While A.F.A. chapters have participated in the entertainment programs of the past five annual conventions, to the Northeastern Ohio group goes the honor of playing host for the second time at an A.F.A. convention. The chapter has organized various committees to assist in welcoming and entertaining the association members and guests attending the convention. Frank J. Dost, Sterling Foundry Co., Wellington, O., is chairman of the general committee, John H. Tressler, Hickman, Williams & Co., Cleveland, is vice chairman, John M. Lathrop, THE FOUNDRY, Cleveland, is secretary and Russell F. Lincoln, Osborn Mfg. Co., Cleveland, treasurer. Photographs and a listing of the Northeastern Ohio Chapter committee members are presented on pages 110 to 121 of this issue.

An interesting program of entertainment for the ladies attending the convention has been arranged by the ladies entertainment committee of the Northeastern Ohio Chap- (*Please turn to page* 109)



Photos courtesy U. S. Navy, U. S. Army Signal Corps, and Cleveland Convention & Visitors Bureau

Tentative Program for the WAR CONVENTION

Photos courtesy U. S. Army Signal Corps and Cleveland Convention Bur

Monday, April 20

9:00 a.m.—Registration Opens

11:00 a.m.—Opening Meeting

Chairman, President H. S. Simpson. Vice-Chairman, D. P. Forbes.
Opening of Congress by President Simpson.
Address of Welcome.
Address by Col. Harold M. Reedall, Cleveland Ordnance District, U. S. Army.

2:30 p.m.—Nonferrous Session

Chairman, M. V. Healey, General Electric Co., Schenectady, N. Y. Co-Chairman, D. Frank O'Connor, Watts Regulator Co., Lawrence, Mass.
Plaster Molds for Precision Nonferrous Castings, by Henry Hagemeyer, Castings Patent Corp., Chicago.
Tentative Recommended Practices for Tin Bronzes—Committee Report.

2:30 p.m.—Malleable Session

Chairman, C. F. Joseph, Saginaw Malleable Iron Division, General Motors Corp., Saginaw, Mich. Co-Chairman, R. J. Anderson, Belle City Malleable Iron Co., Racine, Wis.
Malleable Iron Gating and Risering, by Fred Reeves, Saginaw Malleable Iron Division, General Motors Corp., Saginaw, Mich.
Sand Control in a Mechanized Malleable Foundry, by D. F. Sawtelle, Malleable Iron Fittings Co., Branford, Conn.
Studies on Malleablization and Physical Properties of Some Copper Containing Malleable Irons, by C. H. Lorig and A. R. Elsea, Battelle Memorial Institute, Columbus, O.

4:30 p.m.—Core Practice—Lecture Course

Chairman, E. C. Zirzow, National Malleable & Steel Castings Co., Cleveland.
Lecturer, H. W. Dietert, Harry W. Dietert Co., Detroit.

5:30 p.m.—Reception to Guests from Central and South American Countries

8:00 p.m.—Western Hemisphere Foundry Conference

Chairman, Harold J. Roast, Canadian Bronze Co., Ltd., Montreal, Canada. Co-Chairman, J. S. Vanick, International Nickel Co., New York.
Brass Founding in Mexico, by H. H. Miller, Fundicion de Bronce Miller, Torreon, Coah., Mexico.
Some Aspects of the Gray Iron Foundry Practice in Brazil, by Miguel Siegel, Instituto de Pesquisas Technologicas, Sao Paulo, Brazil.
Brazilian Foundry Industry, by H. A. Hunnicutt, Industrias Chimicas Brasileiras, Sao Paulo, Brazil.
Designing for Foundry Production, by Dr. Ernest Gieger, Sao Paulo, Brazil.
Some Brazilian Foundry Problems, by Dr. Luiz D. Villares, Pirie, Villares & Cia., Sao Paulo, Brazil.

8:00 p.m.—Patternmaking Session

Chairman, Frank Cech, Cleveland Trade School, Cleveland. Co-Chairman, V. J. Sedlon, Master Pattern Co., Cleveland.
Design of Core Boxes and Driers for Core Blowing, by O. A. Van Sickle, City Pattern Works, Detroit.
Equipment for Blowing Cores, by R. F. Lincoln, Osborn Mfg. Co., Cleveland.
Production of Copper Patterns by Electro Forming, by A. K. Laukel, Electro-Chemical Pattern & Mfg. Co., Detroit.

Tuesday, April 21

9:00 a.m.—Sand Shop Course (Session 1)

Chairman, D. F. Sawtelle, Malleable Iron Fittings Co., Branford, Conn.
Fundamentals of Sand Control, by W. G. Reichert, American Brake Shoe & Foundry Co., Mahwah, N. J.

9:00 a.m.—Gray Iron Shop Course (Session 1)

Chairman, W. S. Linnell, Wisconsin Steel Co., Chicago.
Practical Theory of Shrinkage.
Discussion Leader, George Timmons, Climax Molybdenum Co., Detroit.

10:00 a.m.—Malleable Session

Symposium on Graphitization (Section 1)
Chairman, Dr. H. A. Schwartz, National Malleable & Steel Castings Co., Cleveland. Co-Chairman, D. P. Forbes, Gunite Foundries, Inc., Rockford, Ill.
Principles of Graphitization, by Dr. H. A. Schwartz, National Malleable & Steel Castings Co., Cleveland.
Suppression of Primary Graphite, by C. H. Junge, National Malleable & Steel Castings Co., Cleveland.
Some Effects of Hydrogen on the Time of Malleabilization, by C. H. Lorig and M. L. Samuels, Battelle Memorial Institute, Columbus, O.
Temperature Control of Graphitizing Furnaces, by J. H. Lansing, Malleable Founders' Society, Cleveland.
Atmosphere Control in Annealing Furnaces, by R. J. Cowan, Surface Combustion Corp., Toledo, O.
(Symposium concluded at afternoon session.)

10:00 a.m.—Nonferrous Session

Chairman, W. J. Laird, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Co-Chairman, William Romanoff, H. Kramer & Co., Chicago.
Effect of Furnace Atmospheres on Heat Treating of Magnesium and Aluminum Alloys, by D. V. Ludwig, Capitol Foundry Corp., Long Island City, N. Y., and Wayne Martin, Sperry Gyroscope Co., New York.
Salvage of Aluminum Alloys by Welding, by A. T. Ruppe, Bendix Products Division, Bendix Aviation Corp., South Bend, Ind.
Annual Business Meeting of Nonferrous Division, A.F.A.

10:00 a.m.—Apprentice Training Session

Chairman, James G. Goldie, Cleveland Trade School, Cleveland. Co-Chairman, Dean C. J. Freund, University of Detroit, Detroit.
Foundry Apprenticeship Now, How and Why, by Donald F. Lane, Bethlehem Steel Co., Sparrows Point, Md.
Foundry Defense Training Question Box.
Discussion Leader, O. F. Carpenter, associate district representative, Training Within Industry, Detroit.

11:45 a.m.—Special War Production Session

Chairman, Fred J. Walls, International Nickel Co., Detroit.
Speaker—Admiral George Pettingill (retired), commandant and superintendent, Naval Gun Factory, Washington.

12:30 p.m.—Nonferrous Division Round-Table Luncheon

Chairman, B. A. Miller, Cramp Brass & Iron Foundries Division, Baldwin Locomotive Works, Philadelphia. Co-Chairman, C. O. Thieme, H. Kramer & Co., Chicago.

Discussion Topics and Leaders:
Some Causes of Porosity in Silicon Bronze Castings, by J. E. Crown, U. S. Naval Gun Factory, Washington.
Some Causes of Porosity in Navy 'G' and 'M' Metals, by W. B. George, R. Lavin & Sons, Chicago.

12:30 p.m.—Malleable Division Luncheon

2:30 p.m.—Malleable Session
Symposium on Graphitization (Section 2)
Chairman, Dr. H. A. Schwartz, National Malleable & Steel Castings Co., Cleveland. Co-Chairman, Carl Joseph, Saginaw Malleable Iron Division, General Motors Corp., Saginaw, Mich
Intermittent Annealing Furnaces, by W. R. Bean and W. R. Jaeschke, Whiting Corp., Harvey, Ill.
Electric Furnace Annealing, by R. M. Cherry, General Electric Co., Schenectady, N. Y.
Tunnel Kiln Annealing, by R. J. Anderson, Belle City Malleable Iron Co., Racine, Wis.
The Promotion of Annealing Rate by the Selection of Chemical Composition, by W. D. McMillan, International Harvester Co., Chicago.
Arrested Anneal Malleables, by D. P. Forbes, Gunite Foundries Corp., Rockford, Ill.

2:30 p.m.—Patternmaking Session
Chairman, E. J. Brady, Western Foundry Co., Chicago. Co-Chairman, A. Pyle, Jr., Pyle Pattern & Mfg. Co., Muskegon, Mich.
Plastic Coatings for Core Boxes and Patterns, Report of Investigation by George Dreher, Ampco Metal, Inc., Milwaukee.
Discussion of Rubber Coatings for Core Boxes, by J. E. Crown, U. S. Naval Gun Factory, Washington.
Specification for Foundry and Pattern Lumber, by E. T. Kindt, Kindt-Collins Co., Cleveland.
Driers and Green Topping Cores, by George Gedeon, Aluminum Co. of America, and Frank C. Cech, Cleveland Trade School, Cleveland.

4:00 p.m.—Joint Meeting of Ferrous and Nonferrous Groups
Discussion of Government Price Control. Discussion leaders—Representative from OPA, Copper and Brass Section, and representative from OPA, Castings Unit, Iron and Steel Products Section.

4:30 p.m.—Core Practice—Lecture Course
Chairman, L. P. Robinson, Werner G. Smith Co., Cleveland.
Lecturer, H. W. Dietert, Harry W. Dietert Co., Detroit.

6:30 p.m.—Annual Apprentice Instructors' Dinner
Presiding, James G. Goldie, Cleveland Trade School, Cleveland.

6:30 p.m.—Foreman Training Group. Dinner and Discussion
Chairman, W. E. George, Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich.
Why Foremanship Training, by V. J. Swanson, Tractor Works, International Harvester Co., Chicago.
Teaching Foremen to Teach, by W. Odom, William Odom Associates, Chicago.

8:00 p.m.—Refractories for Foundry Use
Chairman, J. A. Bowers, American Cast Iron Pipe Co., Birmingham, Ala. Co-Chairmen, Charles Reed, Jr., Retort & Fire Brick Co., Chicago and R. E. Wilke, Deere & Co., Moline, Ill.
Natural Stone as a Cupola Refractory, by J. A. Bowers, American Cast Iron Pipe Co., Birmingham, Ala.
Monolithic Cupola Linings, by R. A. Clark, Lakey Foundry & Machine Co., Muskegon, Mich.
Patching in the Cupola, by C. S. Reed, Jr., Chicago Retort & Fire Brick Co., Chicago.

Wednesday, April 22

9:00 a.m.—Sand Shop Course (Session 2)
Chairman, C. P. Randall, Eastern Clay Products Co., Eifort, O.
Practical Fundamentals of Sand Shop Control, by W. G. Reichert, American Brake Shoe & Foundry Co., Mahwah, N. J.

9:00 a.m.—Gray Iron Shop Course (Session 2)
Chairman, R. F. Hine, Studebaker Corp., South Bend, Ind.
Shrinkage in Automotive Castings.
Discussion Leader (to be announced).

10:00 a.m.—Annual Business Meeting and Awards Lecture
Address of President Simpson.
Reports of Officers.
Awards Presentation.
Awards Lecture.

2:30 p.m.—Plant Defense and Protection
Report of Committee on Plant Protection During War Times, by James R. Allan, International Harvester Co., Chicago.

2:30 p.m.—Gray Iron Session
Chairman, Max Kuniansky, Lynchburg Foundry Co., Lynchburg, Va. Co-Chairman, John Lowe, Battelle Memorial Institute, Columbus, O.
Temperature Measurement of Molten Cast Iron with the "Rayotube" and Optical Pyrometer, by R. H. Koch and Dr. A. E. Schuh, U. S. Pipe & Foundry Co., Burlington, N. J.
Electronic Structure and Polymorphism of Iron Alloys, by Dr. Roman Smoluchowski, Research Laboratory, General Electric Co., Schenectady, N. Y.
Cupola Control, by Fulton Holtby and H. F. Scobie, University of Minnesota, Minneapolis.
Direct Determination of Combined Carbon in Cast Iron & Steel, by J. G. Donaldson, Battelle Memorial Institute, Columbus, O. (Presented by title.)

2:30 p.m.—Steel Session
Chairman, F. A. Melmoth, Detroit Steel Casting Co., Detroit. Co-Chairman, K. V. Wheeler, American Steel Castings Co., Newark, N. J.
Atmospheric Pressure and the Steel Casting—A New Technique of Gating and Risering, by H. F. Taylor and E. A. Rominski, Naval Research Laboratories, Washington.
Studies of Center Line Shrinkage, by J. A. Duma and S. W. Brinson, Norfolk Navy Yard, Portsmouth, Va.

3:00 p.m.—Chapter Delegate Conference

4:30 p.m.—Core Practice—Lecture Course
Chairman, J. B. Caine, Sawbrook Steel Castings Co., Lockland, O.
Lecturer, H. W. Dietert, Harry W. Dietert Co., Detroit.

6:30 p.m.—Chapter Officers' Dinner

6:30 p.m.—Annual Engineering Foundry Instructors' Dinner

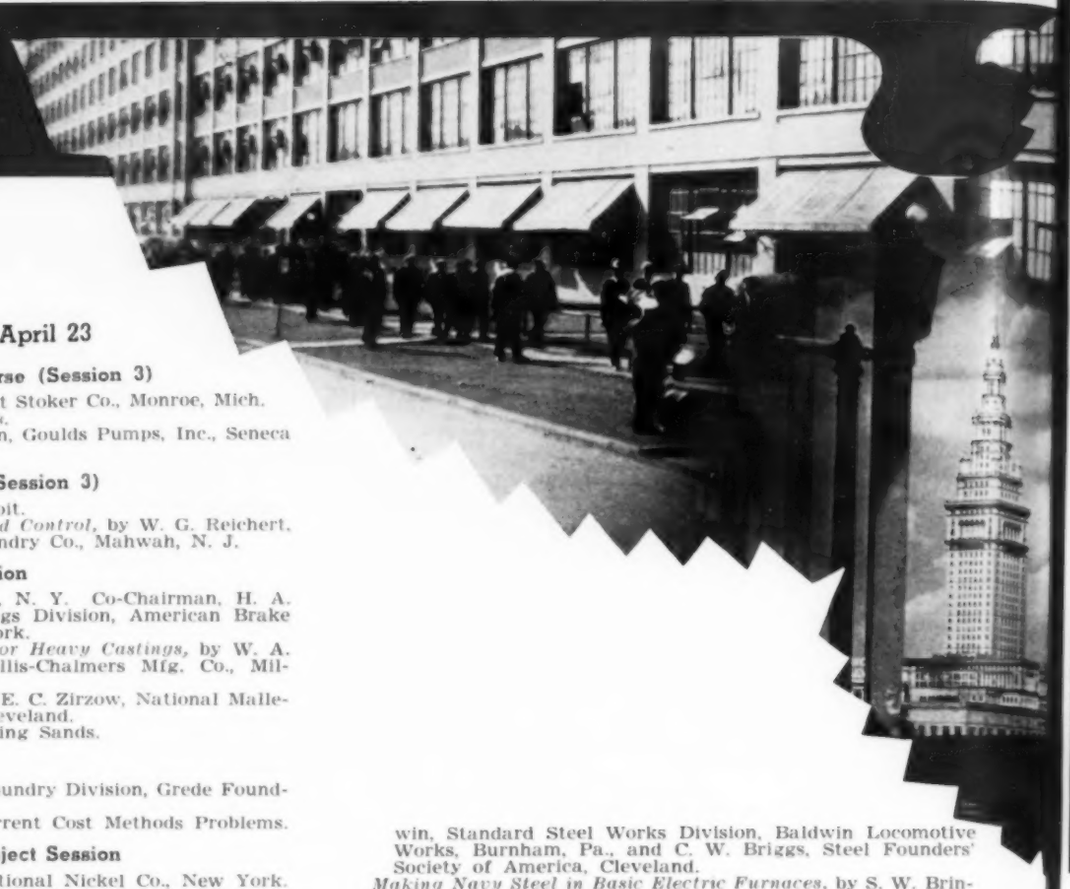
8:00 p.m.—Job Evaluation and Time Study Session
Chairman, F. E. Wartgow, American Steel Foundries, East Chicago, Ind. Co-Chairman, J. Alan Westover, Dyer Engineers, Inc., Buffalo.
The Use of Job Evaluation in the Application of Time Study, by E. L. Berry and E. A. Berg, Link-Belt Co., Chicago.

8:00 p.m.—The Foundry Industry and Engineering Training Session
Chairman, F. G. Sefing, International Nickel Co., New York.
Report of Survey of Foundry Instruction, by A.F.A. Committee on Co-operation with Engineering Schools.
Engineering Graduates in the Foundry, by S. D. Moxley, American Cast Iron Pipe Co., Birmingham, Ala.
College Student Views the Foundry Industry, by C. J. Freund, Dean of Engineering, University of Detroit, Detroit.

8:00 p.m.—Sand Research Session
Chairman, L. B. Knight, Jr., National Engineering Co., Chicago. Co-Chairman, F. L. Weaver, Great Lakes Foundry Sand Co., Detroit.
Investigation of Durability of Foundry Sands, by J. CoVan, University of Illinois, Urbana, Ill.
Investigation of Foundry Sands Durability, by A. S. Nichols, Fred Hintz and F. L. Overstreet, Illinois Clay Products Co., Chicago.
Causes of Drying Out of Synthetic Sands, by N. J. Dunbeck, Eastern Clay Products Co., Eifort, O.

8:00 p.m.—Steel Session
Chairman, L. C. Wilson, Reading Steel Casting Division, American Chain & Cable Co., Inc., Reading, Pa.
Steel Pouring Refractories, by R. H. Stone, Vesuvius Crucible Co., Swissvale, Pa.
Use of Iron Oxides in Cores for Steel Castings, by F. B. Rigan, Key Co., East St. Louis, Ill.
Report of Committee on Radiography.

Tentative Program
For War Conference
—Concluded



Thursday, April 23

9:00 a.m.—Gray Iron Shop Course (Session 3)

Chairman, H. H. Wilder, Detroit Stoker Co., Monroe, Mich.
Shrinkage in Pressure Castings.
Discussion Leader, H. H. Judson, Goulds Pumps, Inc., Seneca Falls, N. Y.

9:00 a.m.—Sand Shop Course (Session 3)

Chairman, E. E. Woodliff, Detroit.
Practical Fundamentals of Sand Control, by W. G. Reichert, American Brake Shoe & Foundry Co., Mahwah, N. J.

10:00 a.m.—Sand Research Session

Chairman, Dr. H. Ries, Ithaca, N. Y. Co-Chairman, H. A. Deane, Brake Shoe & Castings Division, American Brake Shoe & Foundry Co., New York.
Dry Sand Molding Procedure for Heavy Castings, by W. A. Hambley and A. Lebesh, Allis-Chalmers Mfg. Co., Milwaukee.
Sea Coal in Foundry Sands, by E. C. Zirzow, National Malleable & Steel Castings Co., Cleveland.
Report of Committee on Sintering Sands.

10:00 a.m.—Foundry Costs

Chairman, R. L. Lee, Liberty Foundry Division, Grede Foundries, Inc., Wauwatosa, Wis.
Round Table Discussion on Current Cost Methods Problems.

10:00 a.m.—Cupola Research Project Session

Chairman, D. J. Reese, International Nickel Co., New York.
Reports of Sub-Committees of Cupola Research Project.

11:45 a.m.—Special War Production Session

Chairman, Dean C. J. Freund, University of Detroit, Detroit.
Training Methods for War Production, by William F. Patterson, Federal Committee on Apprenticeship, Washington.

12:30 p.m.—Steel Division Round-Table Luncheon

2:30 p.m.—Gray Iron Session

Chairman, S. C. Massari, Association of Manufacturers of Chilled Car Wheels, Chicago. Co-Chairman, R. G. McElwee, Alloy Division, Vanadium Corp. of America, Detroit.
Oxidation Resistance of Ordinary and Graphitized Cast Irons, by C. O. Burgess and A. E. Schrubsall, Union Carbide & Carbon Research Laboratories, Niagara Falls, N. Y.
Cast Iron—Strength vs. Structure, by R. R. Adams, Battelle Memorial Institute, Columbus, O.
Metallurgical Study of Cast Iron for Glass Forming Molds, by W. H. Bruckner, University of Illinois, Urbana, Ill., and H. Czyzewski, Caterpillar Tractor Co., Peoria, Ill.

2:30 p.m.—Plant and Plant Equipment

Chairman, James Thomson, Continental Roll & Steel Foundry Co., East Chicago, Ind., Co-Chairman, W. R. Jennings, John Deere Tractor Co., Waterloo, Iowa, and E. W. Beach, Campbell Wyant & Cannon Foundry Co., Muskegon, Mich.
Casting Cleaning in a Gray Iron Foundry, by H. B. Nye, New York Air Brake Co., Watertown, N. Y.
Priorities and Foundry Equipment, by W. R. Bean, chief, Foundry Equipment and Supplies Unit, Tools Section, War Production Board, Washington.

4:30 p.m.—Core Practice—Lecture Course

Chairman, B. D. Claffey, General Malleable Corp., Waukesha, Wis.
Lecturer, H. W. Dietert, Harry W. Dietert Co., Detroit.

7:00 p.m.—Annual Dinner, A.F.A.

Friday, April 24

9:00 a.m.—Sand Shop Course (Session 4)

Chairman, E. E. Woodliff, Detroit.
Practical Fundamentals of Sand Control, by W. G. Reichert, American Brake Shoe & Foundry Co., Mahwah, N. J.

9:00 a.m.—Gray Iron Shop Course (Session 4)

Chairman, P. T. Bancroft, Republic Coal & Coke Co., Moline, Ill.
Shrinkage—General Castings.
Discussion Leader, E. J. Carmody, C. C. Kawin Co., Chicago.

10:00 a.m.—Steel Session

Chairman, C. E. Sims, Battelle Memorial Institute, Columbus, O. Co-Chairman, John Howe Hall, Philadelphia.
Methods for Producing Steel for Castings.
Acid Electric Furnace Slag Control, by John Juppenlatz, Lebanon Steel Foundry, Lebanon, Pa.
Acid Open Hearth Practice for Steel Castings, by G. S. Baldwin, Standard Steel Works Division, Baldwin Locomotive Works, Burnham, Pa., and C. W. Briggs, Steel Founders' Society of America, Cleveland.
Making Navy Steel in Basic Electric Furnaces, by S. W. Brinson and F. B. Anderson, Norfolk Navy Yard, Portsmouth, Va.
Production of Uniform Steel for a Light Castings Foundry, by C. H. Kain and L. W. Sanders, Lake & Elliott, Braintree, Essex. (Institute of British Foundrymen Exchange Paper)

10:00 a.m.—Gray Iron Session

Chairman, Dr. J. T. MacKenzie, American Cast Iron Pipe Co., Birmingham, Ala. Co-Chairman, V. A. Crosby, Climax Molybdenum Co., Detroit.
Production Hardening of Close Grain Cast Iron, by D. V. Ludwig, Capitol Foundry Corp., Long Island City, N. Y.
Effects of Alloys on Transformation, by R. G. McElwee, Vanadium Corp. of America, Detroit.
Effects of Ladle Inoculation on Austenitic Cast Iron, by J. T. Eash, International Nickel Co., Bayonne, N. J.

10:00 a.m.—Sand Research Session

Chairman, N. J. Dunbeck, Eastern Clay Products Co., Elfort, O. Co-Chairman, C. M. Saeger, National Bureau of Standards, Washington.
Investigation of Sand Properties at High Temperatures—Committee Report.
Flowability of Molding Sands in Terms of Work, by E. O. Lissell, University of Michigan, Ann Arbor, Mich., and E. J. Ash.
Resin Binders in Molding Sand, by E. Pragoff, and C. P. Alvus, Hercules Powder Co., Wilmington, Del.

11:45 a.m.—Special War Production Session

(Speaker to be announced)

2:00 p.m.—Steel Session

Chairman, R. A. Gezelius, General Castings Corp., Eddystone, Pa. Co-Chairman, Henry Phillips, Lebanon Steel Foundry, Lebanon, Pa.
Grinding Wheel Cost Control, by J. A. Westover, Dyer Engineers Inc., Buffalo.
Welding of Medium Carbon Steel Castings by Metal Arc Process, by S. E. Mueller, Falk Corp., Milwaukee; A. B. Smith, American Bureau of Ships, Chicago, and J. F. Oesterle, University of Wisconsin, Madison, Wis.
Report of Committee on Developments in Magnetic Powder Test.

2:00 p.m.—Gray Iron Session

Chairman, Dr. A. E. Schuh, United States Pipe & Foundry Co., Burlington, N. J.
Elastic Properties of Some Alloy Cast Irons, by A. I. Krynitsky and C. M. Saeger Jr., National Bureau of Standards, Washington
Statistical Methods as an Aid to the Control of Foundry Operations, by H. H. Fairfield, Canadian Department of Mines and Resources, Ottawa, Canada.
Effects of Phosphorus on Growth of Cast Iron, by Morris Cohen and M. N. Dastur, Massashusetts Institute of Technology, Cambridge, Mass.

4:30 p.m.—Core Practice—Lecture Course

Chairman, R. F. Lincoln, Osborn Mfg. Co., Cleveland.
Lecturer, H. W. Dietert, Harry W. Dietert Co., Detroit.

Continued

(*Continued from page* 107)

ter. Sterling N. Farmer, Sand Products Corp., Cleveland, is general chairman and Mrs. Arthur J. Tuscany is chairman. The following are vice chairmen of the ladies committee: Mrs. Frank J. Dost, Mrs. Sterling N. Farmer, Mrs. John M. Lathrop, Mrs. Russell F. Lincoln, Mrs. Frank G. Steinebach, and Mrs. John H. Tressler. Registration headquarters for the ladies will be maintained in the Hotel Cleveland.

Plan Program for the Ladies

The annual A.F.A. reception and tea, to be held on Monday afternoon, April 20, is the first event on the ladies entertainment program. The tea will be held at the Hotel Cleveland and will be in charge of Mrs. Frank J. Dost and Mrs. John H. Tressler. Other members of the ladies entertainment program will act as hostesses to welcome the visiting ladies and pour tea. The committee has planned a luncheon and style show for Tuesday noon, April 21. This event will be held in the lounge of the Higbee store under the direction of Mrs. John M. Lathrop and Mrs. Frank G. Steinebach. Wednesday afternoon, April 22, has been left free for shopping. Arrangements have been made for a dinner in the evening to be followed by a theater party. This will be in charge of Mrs. C. M. Beattie, Mrs. Russell F. Lincoln and Mrs. John H. Tressler. On Thursday morning and afternoon, April 23, arrangements have been made for visitations to the studios of WTAM in the N.B.C. Building, Cleveland. The ladies will be taken in small groups so that nothing will be missed. This part of the program will be in charge of Mrs. Sterling N. Farmer. The annual banquet and reception of the association will be held Thursday evening and the ladies' part of that program will be in charge of Mrs. Arthur J. Tuscany. Nothing is scheduled for Friday, April 24, so that that day will be free for shopping, etc.

Registration for men attending the convention and exhibition will take place at the headquarters in the Cleveland Public Auditorium. Exhibits of foundry equipment and supplies also will be staged in that building. Sessions of the convention will be held at the Public Auditorium and the Statler Hotel.

Since metals are of such tremendous military importance, the need for increased production cannot be stressed too greatly, and that theme underlies every activity of the 5-day program including the exhibits of equipment and supplies. The four great exhibit halls of the Public Auditorium will be occupied by firms whose chief purpose in exhibiting is to aid the industry in reaching a full war-time basis as quickly and efficiently as possible. Government representatives will be on hand for consultation on matters of war-time regulations.

Exhibits of ordnance material will be presented in Lakeside Hall under the sponsorship of the Cleveland Post of the Army Ordnance Association. Displays of naval and military equipment suitable for foundry production will be featured at the exhibit, and many other displays of similar nature will be presented in booths of the various other exhibitors where emphasis will be placed on equipment and supplies for producing them. The list of exhibitors is given on pages 122 and 123.

Exhibition Open Monday Night

For the benefit of local Cleveland foundrymen unable to attend the exhibition during the day, arrangements have been made to keep it open on Monday night, April 20, until 10:00 p.m., which has been designated "Northeastern Ohio Night."

Following up a convention activity introduced at the Chicago convention in 1940, a headquarters booth will be established for the "Old Timers" who have played such an important part in advancing the foundry industry to the forefront. The committee heading that activity will be under the direction of Benjamin D. Fuller, Whitehead Bros. Co., Cleveland, a past president of the association, assisted by P. T. Bancroft, Moline, Ill.; Robert E. Wendt, Purdue University, Lafayette, Ind.; Henry Oehling, National Malleable and Steel Castings Co., Cleveland; T. C. Flinn, consulting engineer, New York and C. J. Miller, Fremont Foundry Co., Fremont, O., all of whom have had 50 or more years connection with the industry. A registration book for those who have served 25 or 50 years will be provided and 25 and (*Please turn to page* 197)

Northeastern OHIO CHAPTER Committee Members

F. J. Dost

J. H. Tressler

J. M. Lathrop

Homer Britton

Mrs. R. F. Lincoln

Mrs. S. N. Farmer

J. C. Maher

F. R. Fleig

Mrs. J. H. Tressler

Mrs. A. J. Tuscany

Mrs. J. M. Lathrop

L. F. Miller

S. N. Farmer

J. J. Witenhafer

W. L. Seelbach

E. M. Follman

R. F. Lincoln

W. E. Goebert

H. F. Roberts

F. A. Stewart

T. G. Johnston

Mrs. F. J. Dost

Mrs. F. G. Steinebach

F. C. Cech

Edwin Bremer

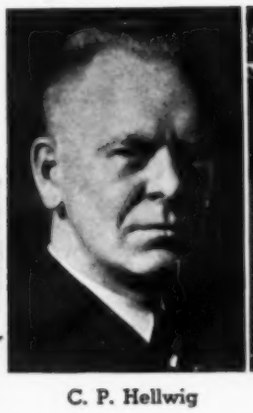
George McNab

J. W. Horan

Louis Klein

H. S. Hersey

George Walton



C. P. Hellwig

William Love

R. C. Wellman

Joseph Hanks Jr.

H. M. Oehling

Mrs. J. J. Witenhafer

Mrs. A. C. Denison

F. J. Grondie

F. W. Pascoe

H. A. Reece

Milton Tilley

S. C. Vessy

Pat Dwyer

F. G. Smith

R. H. West

J. G. Goldie

E. F. Hess

Mrs. W. E. Goebert

Mrs. F. R. Fleig

A. D. Smith Jr.

F. L. Barton

W. E. Rayel

W. L. Woody

W. L. Chatfield

G. A. Wiltse

Mrs. R. W. Hisey

Mrs. T. G. Johnston

J. V. Brost

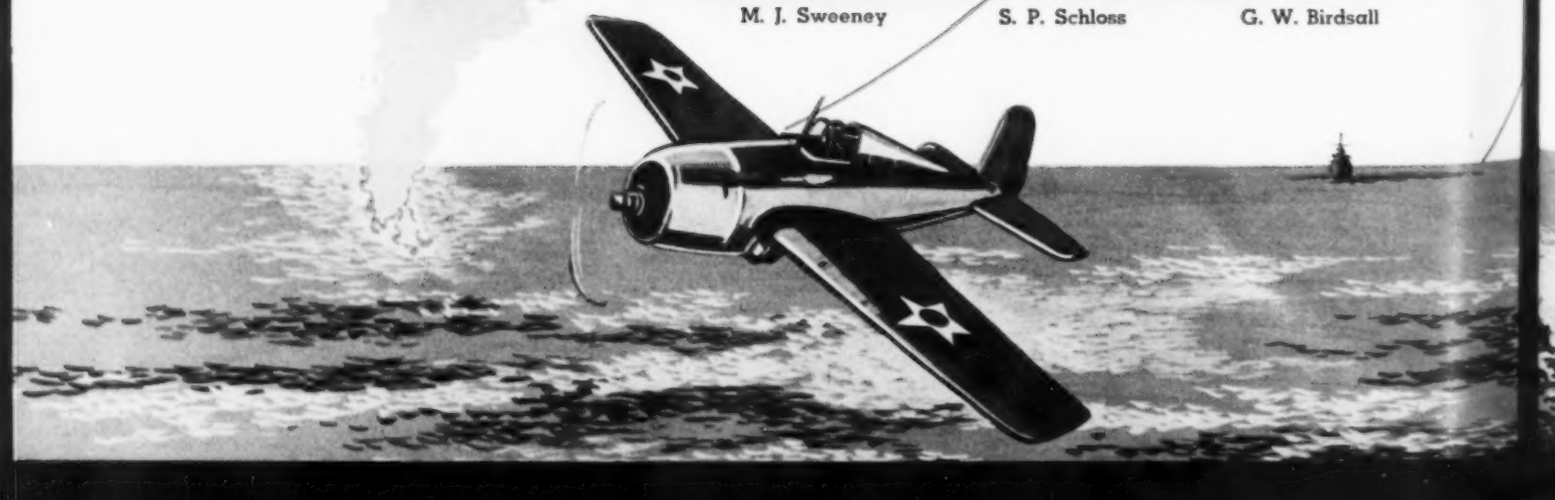
J. B. Heisler

H. C. Gollmar

M. J. Sweeney

S. P. Schloss

G. W. Birdsall



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WILLIAM LOVE
Colonial Foundry Co.
Louisville, O.
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Fulton Foundry & Machine Co.
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National Metal Abrasive Co.
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Norwalk Foundry Co.
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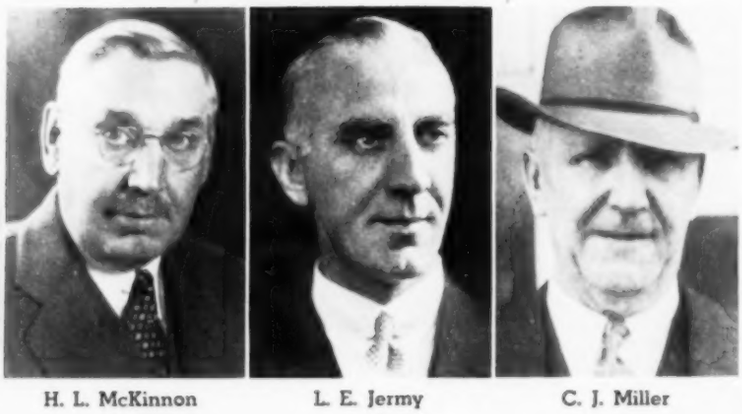

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W. G. Smith

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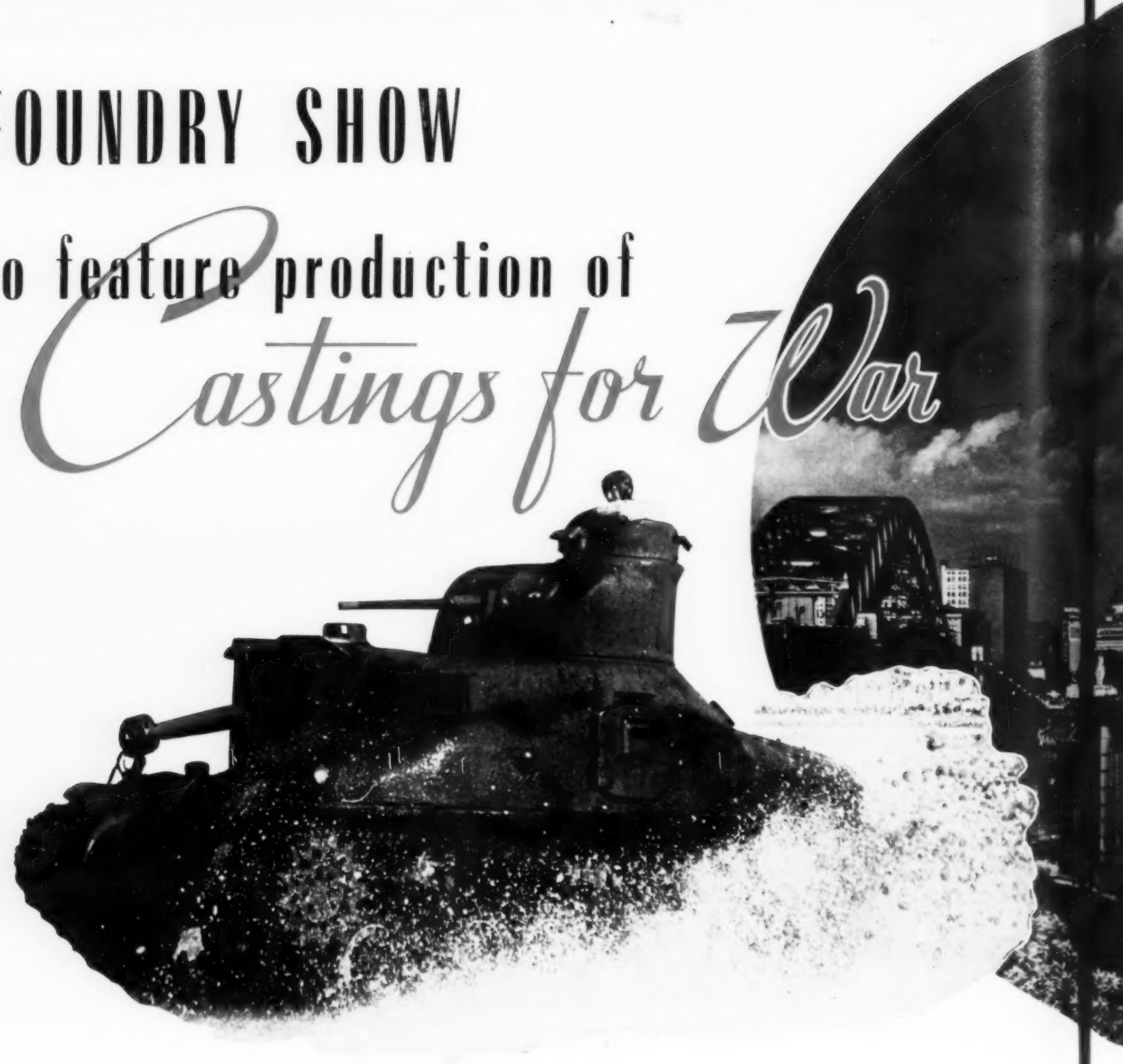
FOUNDRY SHOW

to feature production of *Castings for War*



FOUNDRY and Allied Industries Show, to be staged in the Public Auditorium at Cleveland, April 20 to 24, in conjunction with the 46th Annual Convention of the American Foundrymen's Association, will be devoted entirely to the problem of accelerating production of castings for war. Manufacturers of foundry equipment and supplies and the representatives of various government agencies, such as WPB and OPA, will participate in the Cleveland exhibit for the purpose of helping industry to reach full wartime production as quickly and efficiently as possible. Undoubtedly, the exhibit of cast parts used in war materiel, made possible through the co-operation of the Cleveland Ordnance District of the U. S. Army and individual companies, will prove one of the most interesting features of the 1942 show.

To permit foundry workers in the Cleveland district and surrounding territory to see the displays, the exhibits will be open on Monday night, April 20, until 10 p.m. This will be known as Northeastern Ohio Chapter night and a committee of chapter members will distribute tickets of admission through the management of individual firms. The Monday night feature will take the place of the usual "Saturday Preview" which was held when the industry generally was working on a 5-day a week basis. These tickets will be honored only from noon until 10 p.m. on Monday. On the remaining days of convention week, the show will open at 9 a.m. and close at 5:30 p.m.

List of Exhibitors

(Corrected to March 26)

A

Adams Co.
Ajax Electric Co.
Ajax Electric Furnace Corp.
Ajax Electrothermic Corp.
Ajax Metal Co.
Alpha-Lux Co. Inc.
American Air Filter Co. Inc.
American Crucible Co.
American Foundry Equipment Co.
American Foundrymen's Association
American Metal Market
American Optical Co.
American Society for Metals
American Steel Abrasive Co.
Arcade Mfg. Co.
Automatic Transportation Co.
Ayers Mineral Co.

B

Baker-Perkins, Inc.
C. O. Bartlett & Snow Co.
Bay State Abrasive Products Co.
Black, Sivalls & Bryson Inc.
Blaw Knox Co.
Blystone Corp.
Buckeye Products Co.

C

Adolph I. Buehler
Business Publishers International Corp.
Campbell-Hausfeld Co.
Canadian Radium & Uranium Corp.
Edwin S. Carman Inc.
Certified Core Oil & Mfg. Co.
Chain Belt Co.
Champion Foundry & Machine Co
Chicago Mfg. & Distributing Co.
Chicago Retort & Fire Brick Co.

Clearfield Machine Co.
Cleveland Blow Pipe & Mfg. Co.
Cleveland Flux Co.
Cleveland Pneumatic Tool Co.
Cleveland Quarries Co.
Cleveland Trade School
Climax Molybdenum Co.
L. A. Cohn & Bro. Inc.
Combined Supply & Equipment Co.
Conco Engineering Works
Corn Products Sales Co.
Crucible Furnace Co.

D

Daily Metal Trade
Davenport Foundry & Machine Co.
Dayton Oil Co.
Delhi Foundry Sand Co.
Delta Oil Products Co.
Wm. Demmler & Bros.
Despatch Oven Co.
Detroit Electric Furnace Division, Kuhlman Electric Co.
DeWalt Products Corp.
Harry W. Dietert Co.
Joseph Dixon Crucible Co.
Dodge Mfg. Corp.
Dougherty Lumber Co.
Duquesne Smelting Corp.

E

Eastern Clay Products Inc.
Electro Refractories & Alloys Corp.
Elwell-Parker Electric Co.
Eutectic Welding Alloys Inc.

F

Fanner Mfg. Co.
Federal Committee on Apprenticeship
Federal Foundry Supply Co.
Federated Metals Division, American Smelting & Refining Co.
Fisher Furnace Co.
The Foundry
Foundry Equipment Co.
Freeman Supply Co.
Fremont Flask Co.
Frontier Bronze Corp.

G

Globe Steel Abrasive Co.
Gray Iron Founders' Society
Great Lakes Foundry Sand Co.
Great Western Mfg. Co.
Grimes Molding Machine Co.
Grob Bros.

H

Benjamin Harris & Co.
Hercules Powder Co.
Herman Pneumatic Machine Co.
Hickman, Williams & Co.
Hill & Griffith Co.
Hines Flask Co.
Hoffman Foundry Supply Co.
E. F. Houghton & Co.
Hougland & Hardy Inc.
Hydro Blast Corp.

I

Illinois Clay Products Co.
Illinois Testing Laboratories Inc.
Industrial Minerals Co.
International Harvester Co.
International Molding Machine Co.
International Nickel Co.
Ironton Fire Brick Co.

J

Jefferson Machine Tool Co.
Johnston & Jennings Co.

K

Kindt-Collins Co.
H. Kramer & Co.
Kron Co.

L

Lancaster Iron Works Inc.
Lava Crucible Co. of Pittsburgh
R. Lavin & Sons Inc.

M

Machine Design
Macklin Co.
Mahr Mfg. Co. Division, Diamond Iron Works Inc.
Mall Tool Co.
Malleable Founders' Society
Marathon Chemical Co.
Martindale Electric Co.
Mathews Conveyer Co.
Metals and Alloys
J. S. McCormick Co.
Michigan Smelting & Refining Division Bohn Aluminum & Brass Corp.
Midwest Abrasive Co.
Milwaukee Foundry Equipment Co.
Mine Safety Appliances Co.
Modern Equipment Co.
Monarch Engineering & Mfg. Co.
James A. Murphy & Co.

N

National Engineering Co.
New Equipment Digest
Newaygo Engineering Co.
Niagara Falls Smelting & Refining Co.
William H. Nicholls Co. Inc.

O

S. Obermayer Co.
Oliver Machinery Co.
Osborn Mfg. Co.

P

Pangborn Corp.
Parsons Engineering Corp.
Peerless Mineral Products Co.
Penn-Rilliton Co.
Penola Inc.
Penton Publishing Co.
George F. Pettinos Inc.
Pittsburgh Crushed Steel Co.
Pittsburgh Lectromelt Furnace Corp.
Porter-Cable Machine Co.
Powermatic Ventilator Co.
Productive Equipment Corp.
Pyro Clay Products Co.
Pyrometer Instrument Co.

R

Ramtite Co. Division, S. Obermayer Co.
N. Ransohoff, Inc.
Republic Coal & Coke Co.
Riehle Testing Machine Division, American Machine & Metals Inc.
Rotor Tool Co.
Royer Foundry & Machine Co.

S

Safety Clothing & Equipment Co.
Safety Engineering
Safety Equipment Service Co.
Sand Products Corp.
Claude B. Schneible Co.
Schramm Inc.
F. E. Schundler & Co. Inc.
Scientific Cast Products Corp.
Semet-Solvay Co.
Seymour & Peck Co.
Simplicity Engineering Co.
W. W. Sly Mfg. Co.
Smith Facing & Supply Co.
Smith Oil & Refining Co.
Werner G. Smith Co.
SPO Inc.
Spencer Turbine Co.
Springfield Aluminum Plate & Castings Co.
Standard Conveyor Co.
Standard Sand & Machine Co.
Steel
Steel Shot & Grit Co.
Steelblast Abrasives Co.
Sterling Grinding Wheel Division, Cleveland Quarries Co.
Sterling Wheelbarrow Co.
Frederic B. Stevens Inc.
Superior Sand Corp.
Swan-Finch Oil Corp.

T

Tabor Mfg. Co.
Taggart & Co.
Tamms Silica Co.
Titanium Alloy Mfg. Co.
Toledo Scale Co.

U

United Compound Co.
United Oil Mfg. Co.
United States Bureau of Mines
United States Department of Labor
United States Graphite Co.
U. S. Hoffman Machinery Corp.
U. S. Reduction Co.

V

Vanadium Corp. of America
Vesuvius Crucible Co.

W

Wadsworth Core Machine & Equipment Co.
Walker Mfg. Co.
J. D. Wallace & Co.
Western Metals Co.
Western New York Chapter
Whitehead Bros. Co.
Whiting Corp.

Y

Yale & Towne Mfg. Co.

Z

Zanesville Sand Co.

A·F·A awards Recognize Contributions to Foundry Progress

IN RECOGNITION of the contributions which four of its members have made to the work of the association and the progress of the foundry industry, the American Foundrymen's Association will present two gold medals and will confer two life memberships during the First Western Hemisphere Foundry Congress and the 46th Annual Convention of the A.F.A. in Cleveland, April 20 to 24. The formal presentation will take place at the annual business meeting to be held at 10 a.m. on Wednesday of convention week.

ALFRED L. BOEGEHOLD, chief metallurgist, General Motors Research Laboratories, Detroit, will receive the J. H. Whiting Gold Medal of the association in recognition of his outstanding contributions to the field of metallurgical research in cast iron and malleable iron.

JOHN E. GALVIN, president Ohio Steel Foundry Co., Lima, O., will be awarded the John A. Penton Gold Medal of the association for his unfailing helpfulness and generosity which has contributed to the general advancement of many others in the steel casting industry.

ROY M. ALLEN, consulting metallurgical engineer, Bloomfield, N. J. will receive an honorary life membership in the American Foundrymen's Association in recognition of his services in conducting the first of the association's annual convention lecture series. The material presented at that course later resulted in the publication of the book *The Microscope in Elementary Cast Iron Metallurgy.*

PAT DWYER, engineering editor of the THE FOUNDRY, Cleveland, will receive an honorary life membership in the A.F.A. in recognition of the immense good he has contributed to the foundry industry through his writings on all phases of foundry practice.

The board of awards of the association is composed of the last seven living past presidents as follows: Chairman, Lester N. Shannon, Stockham Pipe Fittings Co., Birmingham, Ala.; Henry S. Washburn, Plainville Castings Co., Plainville, Conn.; Marshall Post, Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.; Hyman Bornstein, Deere & Co., Moline, Ill.; James L. Wick Jr., Falcon Bronze Co., Youngstown, O.; Dan M. Avey, Tulsa, Okla.; and Frank J. Lanahan, Ft. Pitt Malleable Iron Co., Pittsburgh.

ALFRED L. BOEGEHOLD is noted for his extensive and valuable research work in the field of cast iron and malleable iron. For many years he has been prominent in the work of the A.F.A., the American Society for Metals, the American Society for Testing Materials and the American Institute of Mining and Metallurgical Engineers. He is also a member of the Institute of Metals (British).

Mr. Boegehold, a native of Mount Vernon, N. Y., received his earlier education in the schools of that city and was graduated from Cornell University, Ithaca, N. Y. in 1915 with a degree of mechanical engineering. His first industrial connection was with the Remington Arms & Ammunition Co., Bridgeport, Conn. as junior engineer. During 1917 he was casting foreman for the Bridgeport Brass Co., returning to the Remington company where he was employed as metallographer and metallurgist from 1917 to 1919. During part of 1919 he was with the Army Ordnance at Washington and the following year was at Bridgeport, Conn. as metallurgist with the Remington U.M.C. Co. In 1920 he went with the General Motors Corp. as metallurgist at Dayton, O., where he

remained until 1925. At that time he was transferred to the General Motors Research Laboratories at Detroit where he is now chief metallurgist. In that capacity he has directed numerous research projects in the field of metals used in automotive production, and the results of much of this work have been presented in the technical press or before the A.F.A. and other technical societies.

JOHN E. GALVIN is an outstanding example of one who has risen from the ranks to the highest executive position in the industry, for his two foundries, one at Lima and the other at Springfield, O., are important units of the steel casting industry. Mr. Galvin was born at Chattanooga, Tenn. After receiving his formal education at Wittenberg College, he started his industrial career in 1900 with the Illinois Steel Co. at South Chicago, Ill., as night foreman in the open-hearth department. From 1902 to 1904 he was with the Peru Steel Casting Co., Peru, Ind., as assistant superintendent. He then became connected with the American Steel Foundries as acting manager at Pittsburgh and later as manager of the Franklin, Pa. plant. In 1907, Mr. Galvin was made vice president of the Ohio Steel Foundry Co., a position he retained until 1918 when he was elevated to the presidency of that firm.

John E. Galvin

A. L. Boegehold

Mr. Galvin served as a director of A.F.A. for 3 years. He has been interested in many civic and industrial activities, serving as director of the Federal Reserve Bank of Cleveland for 10 years, as director of the Ohio Manufacturers' Association, as president of the Lima Manufacturers' Association, and as National Councilor of U. S. Chamber of Commerce. He was also a delegate at large from Ohio to the National Republican convention in Philadelphia in 1940. In addition to his membership in the American Foundrymen's Association, he holds membership in the Steel Founders' Society of America, the American Society of Mechanical Engineers, the American Institute of Mining and Metallurgical Engineers, and the American Society for Metals, and American Society for Testing Materials.

R. M. Allen

Pat Dwyer

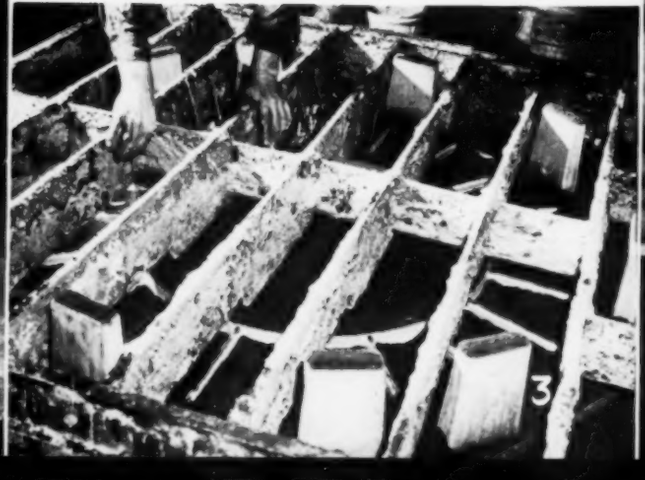
ROY MORRIS ALLEN, was born in Coleville, Pa., and was educated in the public and high schools of Butler, Pa. For 16 years he was supervising engineer in the engineering department of Bell System, now the Bell Telephone Laboratory. For the past 17 years he has served as a consulting metallurgical engineer, several of those years being spent with American Car & Foundry Co. as research metallurgist. Mr. Allen has made numerous inventions including several on submarine detection apparatus developed during World War I. A licensed professional engineer of New York State, he is a member of the American Foundrymen's Association, the American Institute of Mining and Metallurgical Engineers and the American Society for Testing Materials. He has served as a member of the A.F.A. Committee on Cast Iron, the A.S.T.M. Committee A-3 on Cast Iron and as chairman of Subcommittee VII of Committee A-3. With a wide reputation as a microscopist, he is also a member of the New York Academy of Sciences, American Microscopical Society, Biological Photographic Association and the New York Mineralogical Club.

PAT DWYER, for the past 23 years engineering editor, THE FOUNDRY, whose name and works are known in every country in the world where foundry work is practiced, was born in Ireland, Aug. 5, 1875. At the age of 10 he arrived in Nova Scotia and 6 years later began his foundry ap- (*Please turn to page* 201)

Converted to War Work

Fig. 1—Tapping aluminum alloy from a 450-pound tilting-type, crucible furnace into smaller ladles which will be used to pour off the molds. Finished product will be sent to a converted automobile factory or eastern manufacturer of bomb sights. Specific designation and destination of castings is secret. Fig. 2—After placing cores molds are brushed to remove any loose sand particles. Fig. 3—After the facing sand is placed over the pattern

OEM Defense Photos
By Palmer

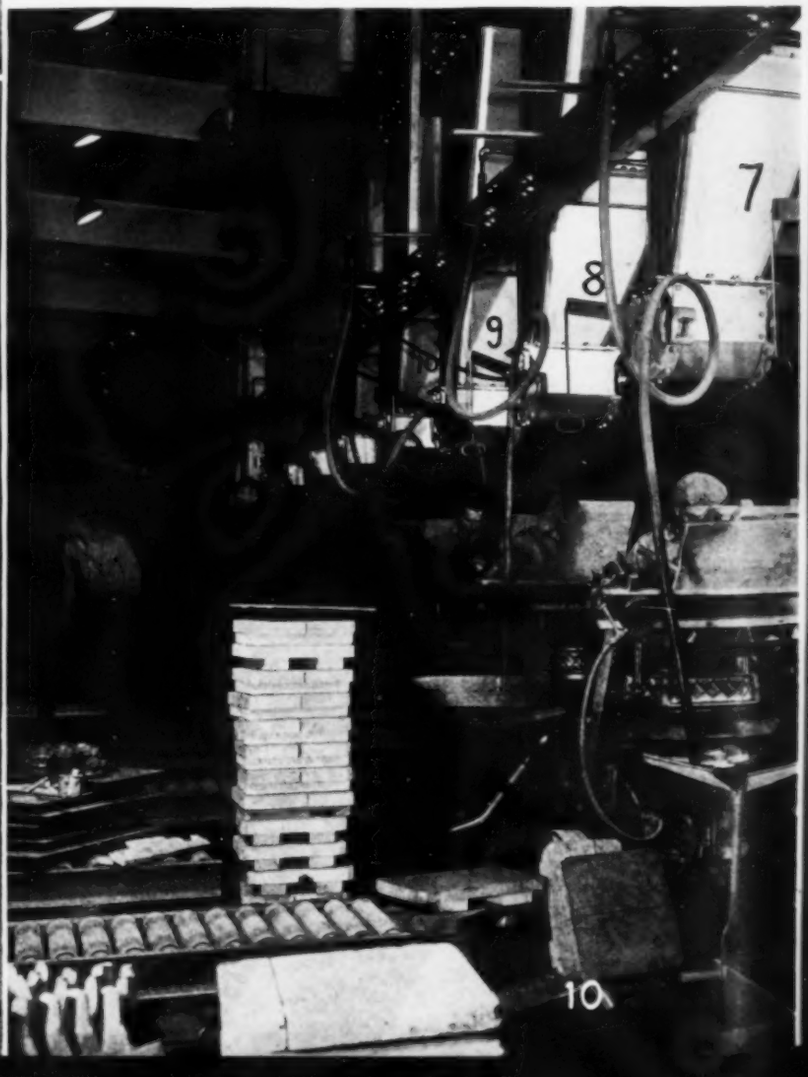


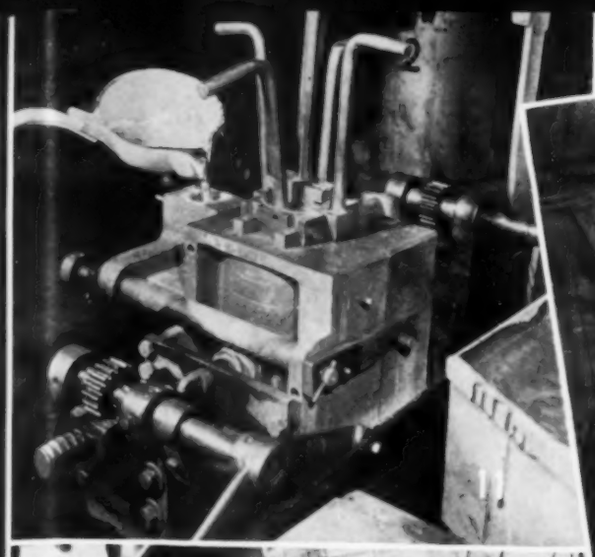
face in this large mold, the gaggers for holding the backing sand in place are located carefully. Fig. 4—Pouring molten aluminum alloy into the molds. Fig. 5—Skin drying a large mold to eliminate trouble from moisture. Fig. 6—Placing the cope on the drag of a snap flask. The guide pins insure accurate relationship between the two. Fig. 7—Closing a large sand mold is a delicate operation requiring careful supervision

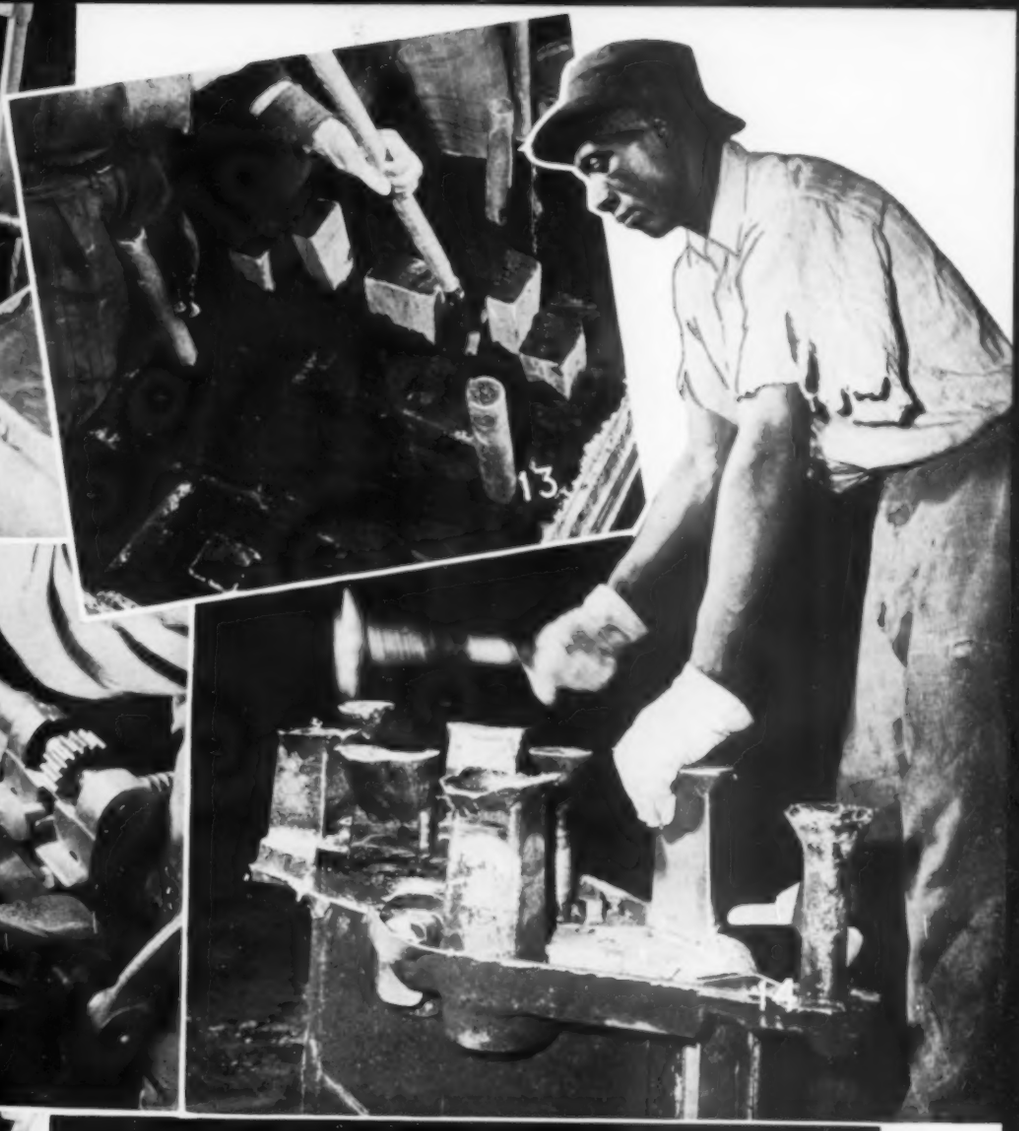
MIDWEST ALUMINUM and MAGNESIUM FOUNDRY

Converted to War Work

Fig. 8—Molten aluminum being poured from a transport ladle into a 300-pound holding pot from which metal will be obtained for filling the molds. Fig. 9—Taking temperature readings of molten magnesium alloy through the protective crust. Flux is sprinkled over the surface to prevent burning at the hole in the crust when the thermocouple is removed. Fig. 10—Small castings are made on jolt squeeze machines. Fig. 11—Pouring molten aluminum into a permanent mold. Fig. 12—After a short time, sufficient for the metal to solidify, the casting is removed from the mold. Fig. 13—Peening the sand at various points to insure firmness, proper density, and true conformity to pattern. Fig. 14—Hammering the casting to dislodge the sand core. Fig. 15—A young inspector examines a rough permanent mold casting previous to removal of the gates and risers



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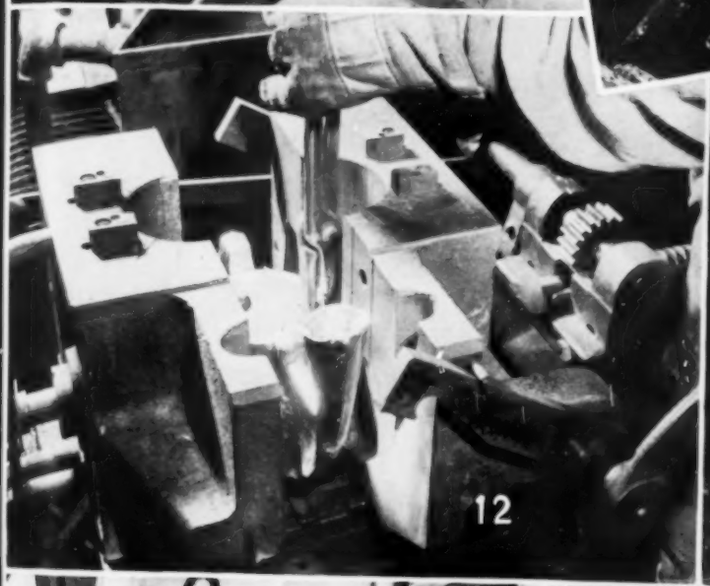
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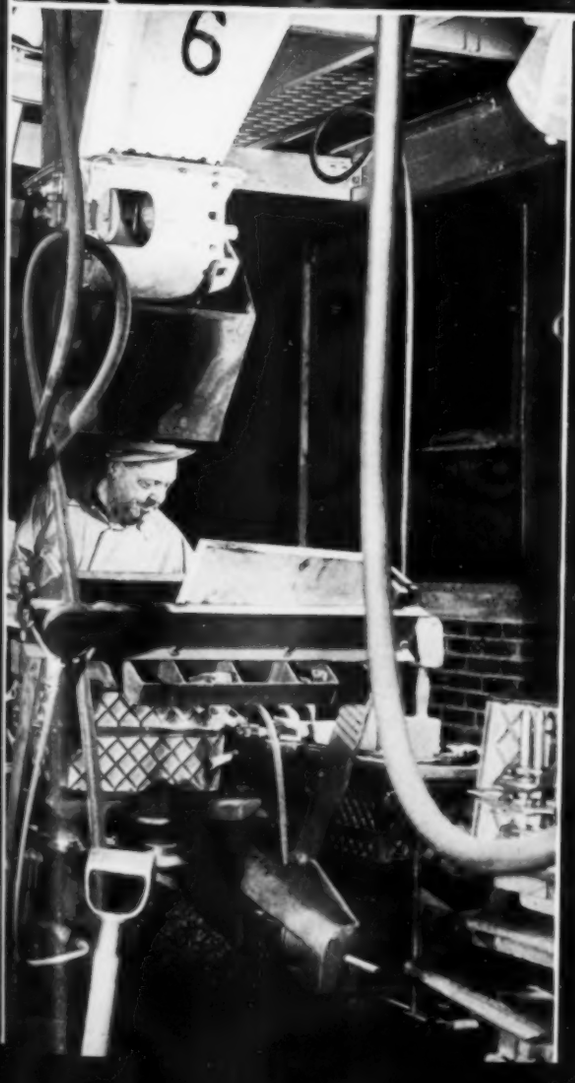
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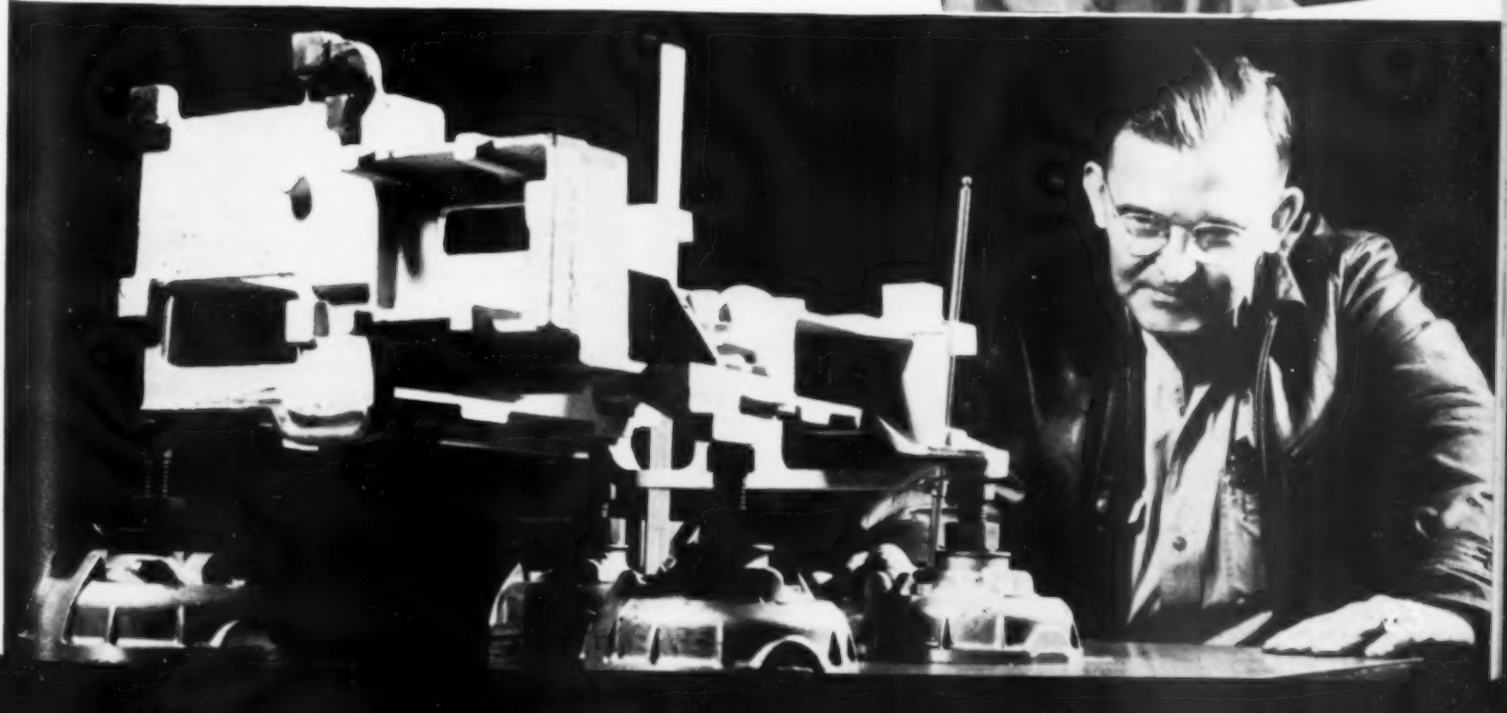
Fig. 16—A load of aluminum alloy pistons being placed in the oven for a low temperature precipitation heat treatment. Fig. 17—Removing the gates and risers from a large ring casting on a band saw. Fig. 18—Surface of a magnesium casting being touched up with a small grinder. Operation is conducted in a specially constructed exhaust hood to insure removal of fine particles which might cause a fire. Fig. 19—Lowering a basket of aluminum castings into a quench tank from a

MIDWEST ALUMINUM and MAGNESIUM FOUNDRY

Converted to War Work

★

high temperature, solution heat treating furnace. Fig. 20—Removing abrasive blasted, cleaned castings from the turntable. Fig. 21—Adjusting controls on heat treating furnace. Fig. 22—Young workman examining a casting of which more than half consists of gates and risers. After cutting off the latter are remelted. Fig. 23—Checking a large casting on a surface plate against the blue print. Fig. 24—This young woman is inspecting magnesium alloy sand castings



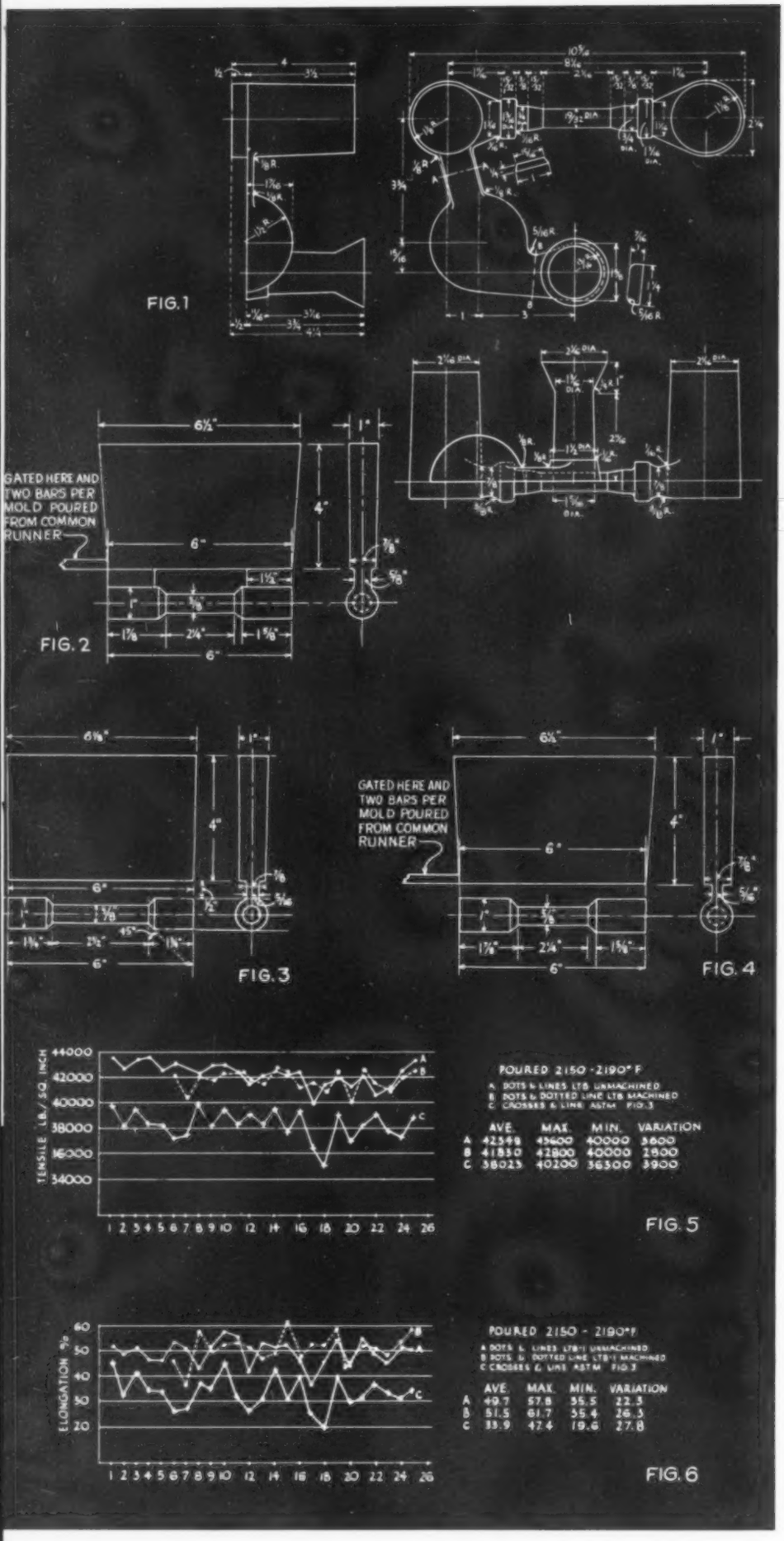


FIG. 1
GATED HERE AND TWO BARS PER MOLD POURED FROM COMMON RUNNER
FIG. 2
FIG. 3
GATED HERE AND TWO BARS PER MOLD POURED FROM COMMON RUNNER
FIG. 4
TENSILE LB./SQ. INCH
POURED 2150-2190° F
A. DOTS & LINES LTB UNMACHINED
B. DOTS & DOTTED LINE LTB MACHINED
C. CROSSES & LINE ASTM FIG. 3
AVE. MAX. MIN. VARIATION
A 42548 45600 40000 5600
B 41850 42800 40000 2800
C 38025 40200 36300 3900
FIG. 5
ELONGATION %
POURED 2150 - 2190°F
A DOTS & LINES LTB'I UNMACHINED
B DOTS & DOTTED LINE LTB'I MACHINED
C CROSSES & LINE ASTM FIG 3
AVE. MAX. MIN. VARIATION
A 49.7 57.8 35.5 22.3
B 51.5 61.7 35.4 26.3
C 33.9 42.4 19.6 27.8
FIG. 6

LET'S TAKE

A Challenge

DURING the past year the editor of THE FOUNDRY has discussed the matter of specifications for the various types of castings with many men within the foundry industry as well as those engaged in furthering the war effort in Washington. Usually these conversations indicate the need for immediate study and co-ordination of specifications for castings if the five branches of the foundry industry are to render maximum service in the battle of production.

With this in mind, the editor requested John W. Bolton, an advisory editor of THE FOUNDRY, to discuss this important subject from his personal background of experience. For over 20 years Mr. Bolton has been active in specification work, serving on committees of various societies dealing with a variety of cast alloys. These years of service in the cause of castings equip him well to point to weakness and inconsistencies in the present specification structure.

This article presents a challenge to every producer of castings that cannot be ignored in this time of national emergency.

The Editor

Fig. 1—A test bar which is comparatively inexpensive to produce has no overall riser to cut off, and may be machined readily to the 0.505-inch diameter. Fig. 3—American Society for Testing Materials test bar for bronzes and brasses. Fig. 2—Navy department test bar often called the Webbert bar. Fig. 4—Another Navy department test bar. Figs. 5 and 6—Curves showing results obtained on comparative tests between various types of bars

A LOOK AT Specifications

WAR demands many readjustments. Cherished practice, outmoded procedures and cumbersome methods must be scrapped. Ruthless realism is required.

The first step in the use of a material is its prescription by the designer. Specifications should be available from which he can select easily materials for the parts designed. Specifications for materials should be clear cut, should insure the right quality for the usage, and permit economical manufacture.

There are many specifications emanating from numerous sources. Some are clear, sound, and intelligible. Others are ambiguous and ineffective. Co-ordination, correlation and simplification of specifications is a pressing need at this time.

Outlines Nature of Tests

A casting is made to serve some specific engineering service. Measures of its value are ultimate economy and safety. Behavior in service is the final answer. It rarely is possible to hold up a lot of castings while an extended service test is run on a few castings. Hence, we have specifications prescribing various test properties, such as tensile strength, ductility, hardness, perhaps impact or microstructure and so on.

In many cases it has been found by experience that metals meeting certain given tests have excellent expectancy of giving satisfactory service life. In such cases we have sound basis for specification. Specification merely is a partial assurance that the article resembles, in its prescribed test properties, material proved to be, or perhaps merely assumed to be, equivalent to articles found satisfactory for and in service.

That a test bar meets certain requirements is not absolute assurance the castings will be exactly equivalent. The casting's properties may be better or they may be worse than those of the test bar. This is true also of wrought and of welded materials. The following should be expected of the test coupon or bar:

1. It should represent such soundness and density as is attainable under good foundry pouring and gating practice. In other words it should be well fed, free from shrinkage and other defects, just as the castings should be free from defects.

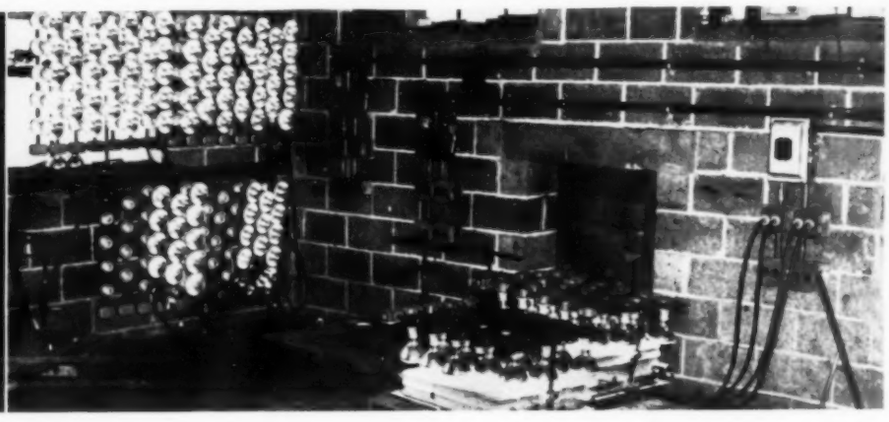
2. Its thermal history should be similar to that of the castings which it represents, insofar as is practical or possible. This means first that the same sort of sand should be used for both test bar and casting. Under no conditions should a bar, as say of bronze, be poured into or against a chill when the castings are made in green sand.

In case of heat treated castings, as for example steel, the test coupons should be treated with the castings they represent. They should be put on or in the castings, so that the actual heating and cooling cycles of both coupons and castings are as alike as possible. In no case should heavy castings be put in the center of a car in a large pile and the coupon put over on the outer edge of the car. This is particularly true in case of normalizing.

Light and Heavy Sections

Gray iron is affected somewhat more materially by cooling rate (effect of section or mass) than other materials. When poured from the same ladle, there may be differences of 50 per cent in tensile strength between light and very heavy sections. To give a reasonable measure of what may be expected in castings, the modern A.S.T.M. A48-41 specification provides for three sizes of test bars, and indicates the castings sections to which these apply. A little intellectual honesty will go a long way toward promoting proper and extended utilization of cast products, and to insure that these will give good service. (*Please turn to page* 208)

GREEN SAND MOLDS dried by INFRA RED LAMPS



By L. M. DURYEE
Industrial Power Engineer
Connecticut Light & Power Co.
Waterbury, Conn.

INFRA red is as old as the hills. It is, in fact, as old as the sun itself. For centuries man has lived by means of solar radiation, taking his food from the irradiated soil, his fuel formed in the earth with infra red. As humans became more proficient in the application of radiant energy they developed many refinements. Greenhouses were built, for example, for plant propagation, especially in out of season months of the year. Instantaneous conversion of radiant energy into useful heat as it strikes the opaque ground is trapped by these glass enclosures. This builds up higher useful temperatures. Out of season greenhouse radiant heating, aided by supplementary heat sources, has worked very well indeed. More recently the domestic hot water supply in thousands of southern homes, notably in Florida, Louisiana and Texas, has been heated by solar radiation in much the same manner as in greenhouses.

Seven years ago the Ford Motor Co. in its constant search for greater speed in industrial operations developed the use of radiant energy from incandescent lamp sources. In truth they "electrified" the paint drying process throughout the country. Patent No. 1,998,615 issued to the Ford Co. covers the application of radiant energy from all incandescent lamp sources to paint drying. Since 1935 all Ford car priming coats have been finished in long tunnels of infra red lamps which completely surround the cars as they travel through the tunnels. One hour drying time was reduced to ten minutes by this use of radiant energy. Army scout cars (jeeps) are finished now in the Willys-Overland Co. in the same way. Infra red paint drying has swept the country.

Applications of radiant heat to drying of green sand molds in foundries has lagged behind the wide use of infra red in other industries largely because the foundryman has been unable to obtain specific information on matters which personally concern him. What advantages in this application of infra red; what the costs; what use, indeed, of skin drying at all?

Foundry practice today, under our exacting requirements, is definitely different from that of only a few years ago. Today's flasks are no longer made of wood. (*Please turn to page* 218)

Titanium Deoxidized Steel *Shows good* Sulphide Distribution

MANY steel foundries find it necessary to use aluminum as a final deoxidizer to prevent pin-hole porosity in steel cast in green-sand molds, but when only a moderate amount is used, or around one pound per ton, low ductility often is encountered in the steel produced. To avoid this undesirable condition, the aluminum addition may be restricted to a very small amount insufficient to affect the ductility, or more commonly an excess or about two pounds or more per ton is used. The trouble with the first alternative is that in practice it is almost impossible to regulate the small aluminum addition closely enough so that it does not either exceed the amount permissible for good ductility, or fall below the amount required to prevent pin-hole porosity.

The second alternative often is found to be more practical, because with the larger additions pin-hole porosity is eliminated as explained recently by Sims and Zapffe ("The Mechanism of Pin-Hole Formation", *Transactions* A. F. A., Vol. 49, No. 2, P. 255), and the ductility of the steel is better than with moderate additions of around one pound per ton. The reason for this, according to Sims and Dahle ("Effect of Aluminum on the Properties of Medium Carbon Cast Steel", *Transactions* A. F. A., Vol. 46, No. 1, P. 65) is that with a limited degree of aluminum deoxidation the sulphide inclusions separate from the steel in a eutectic or network arrangement which impairs the ductility, while with an excess of aluminum the sulphides occur in the more usual globular form and irregular arrangement, possibly owing to the occurrence of aluminum sulphide.

It was shown by Sims and Dahle that other strong deoxidizers beside aluminum, such as zirconium and titanium, may produce the undesirable network form of sulphides, and some tests recently have been made to see if ferro carbon-titanium could be substituted

Fig. 1 (Top)—Heat No. 25 without aluminum or ferro carbon titanium treatment, showing good distribution of large globular sulphide inclusions. Fig. 2 (Top center)—Heat No. 40 treated with ½-pound aluminum per ton and no ferro carbon titanium, showing a "bad" or distinct network arrangement of sulphide inclusions. Fig. 3 (Lower center)—Heat No. 20 treated with 1½ pounds aluminum and 4 pounds ferro carbon titanium per ton, showing "fair" arrangement of sulphide inclusions and a few angular titanium cyanide crystals. Fig. 4 (Bottom)—Heat No. 94 treated with 1 pound aluminum and 10 pounds ferro carbon titanium per ton, showing sulphide distribution similar to untreated steel in Fig. 1

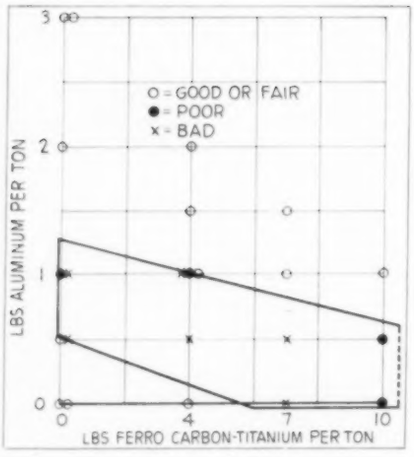


Fig. 5—Sulphide distribution ratings of heats plotted according to the strong deoxidizers used. Enclosed area shows deoxidation given poor or bad sulphide distribution with described melting practice

Relation of Special Deoxidation to Sulphide Distribution in Small Steel Castings.

Heat No.	Special Deoxidation Pounds per Ton. Aluminum	Ferro Carbon Titanium	Microscopic Sulphide Distribution	Variations from Normal Practice
25	0	0	Good.	None.
47	0	0	Good.	Pouring temperature 2955° F.
46	0	4	Fair.	Pouring temperature 2950° F.
68	0	7	Bad.	None.
66	0	10	Poor.	None.
40	½	0	Bad.	Pouring temperature 2950° F.
48	½	0	Fair.	Pouring temperature 2800° F.
41	½	4	Bad.	16 min. delay to reach 3000° F. before pouring.
49	½	4	Good.	Unsound casting; 2765° F. pouring temperature. 21 min. delay after F.C.T. addition to dissolve skull.
67	½	7	Bad.	None.
65	½	10	Poor.	None.
92	1	0	Poor.	None.
54	1	4	Bad.	16 min. delay before F.C.T. addition. Pouring temperature 2935° F.
64	1	4	Poor.	None.
100	1	4	Fair.	None.
98	1	7	Fair.	None.
94	1	10	Good.	None.
20	1½	4	Fair.	None.
18	1½	7	Fair.	None.
88	2	0	Fair.	None.
89	2	4	Good.	None.
55	3	0	Fair.	Pouring temperature 2945° F.
93	3	0	Fair.	None.

for part of the excessive amount of aluminum required to avoid the network sulphides, and what amounts of that alloy would be effective. Ferro carbon-titanium has, of course, served the steel foundry industry for many years as an efficient final deoxidizer and cleanser, but its use in cast steel generally has been confined to fairly small additions where no aluminum was used. Although excellent ductility resulted from such practice, it was not always found that pin-hole porosity could be entirely avoided with titanium alone when the castings were poured in green sand.

The experiments here reported were made with steel containing 0.26 to 0.31 per cent carbon, 0.50 to 0.61 per cent manganese, 0.26 to 0.39 per cent silicon, about 0.03 per cent phosphorus, and about 0.05 per cent sulphur. A 17-pound basic-lined induction furnace was used for melting, and the steel was exposed to the air without any slag cover during the process. After deoxidation of the steel with high carbon ferromanganese and 50 per cent ferrosilicon, various amounts of aluminum up to 3 pounds per ton (of 2000 pounds), and of ferro carbon-titanium up to 10 pounds per ton were added. When both special deoxidizers were used the aluminum was added first.

Generally one or two minutes elapsed between the ferrosilicon and ferro carbon-titanium additions, and two minutes after the latter addition the steel was poured. The pouring temperatures, measured with a Holtby tungsten-graphite couple were generally between about 2850 and 2925 degrees Fahr., though some higher and lower temperatures were tried.

Each heat was cast in warm dry sand in the form of a block about 5 inches high, 6 inches long, and 2 inches thick. When this block had solidified, or about 3 or 4 minutes after pouring, the mold was buried in silocel powder to retard the rate of cooling as in a large casting. When cold the block was cut up, and a specimen about half an inch square for microscopic examination was cut midway between the sides of the block and about 2 inches above the bottom.

The specimens were examined microscopically and compared solely on the basis of the arrangement of the sulphide inclusions, this being checked by two or three observers. Some photomicrographs are presented as *Figs.* 1 to 4 to illustrate the terms used for the microscopic gradings, but they show only one spot for each type, while the specimens were graded according to the average appearance of the whole polished surface. The designation *bad* was applied to specimens in which the sulphides occurred as eutectic groups and in a distinct network arrangement of more or less elongated particles.

Such specimens were quite easily distinguished from the others. The grade of *poor* was applied to specimens in which this structure was less definite and the networks were composed of coarser particles with less eutectic. The *fair* and *good* designations applied to the rest of the specimens were rather indefinite and no clear-cut distinction was possible between them. In such specimens the sulphides were globular, with no eutectic groups, (*Please turn to page* 204)

PLANNING the nonferrous FOUNDRY

BY N. K. B. PATCH

IN PREVIOUS articles referring to the design and layout of the more efficient nonferrous foundry we have discussed the main foundry building with its melting room, the cleaning room with its inspection and shipping departments adjacent thereto, and the core room as well as the general store room in which is maintained the supplies for the different departments.

In connection with the discussion of the cleaning room it was pointed out that a foundry producing a variety of compositions necessarily would have to keep those compositions isolated from one another and particularly insure the return of the gates, risers and sprues from any particular composition back to a metal room and there kept in the bin especially designated for that particular composition.

This would insure the use of gates, risers and sprues from a given composition only in the melting of further heats of that same composition. Thus it will be seen that the metal room where the general stores of metals is maintained should be adjacent to the melting or furnace room and at the same time be at a convenient point for economical return of such gates, risers and sprues from the cleaning room.

Furthermore, this room should be equipped with the necessary bin storage for the accurate maintenance of each composition as a unit separate from any other composition. Hence, any inability to identify a given piece by looking at it would be overcome by the fact that it has been definitely sorted at its source when the composition was known. Thereafter it was placed in the properly labeled bin and which definitely proves what composition the bin contains.

Bins Should Be Substantial

These bins should be constructed so that the rapid movement of these heavy pieces of metal in and out of the bins will not tend to break them down. Strong construction is absolutely essential. Some foundries have had thin sheet metal bins constructed or have trusted to the piling of bins full of metal or some other haphazard method of that kind which resulted in the mixing of two compositions by accident. That consequently resulted in the contamination of heats causing complete rejection of all castings poured. Such expense could have been overcome in the first place by the provision for the storage in bins that are solid, safe and of such dimension that they do not overflow one into the other.

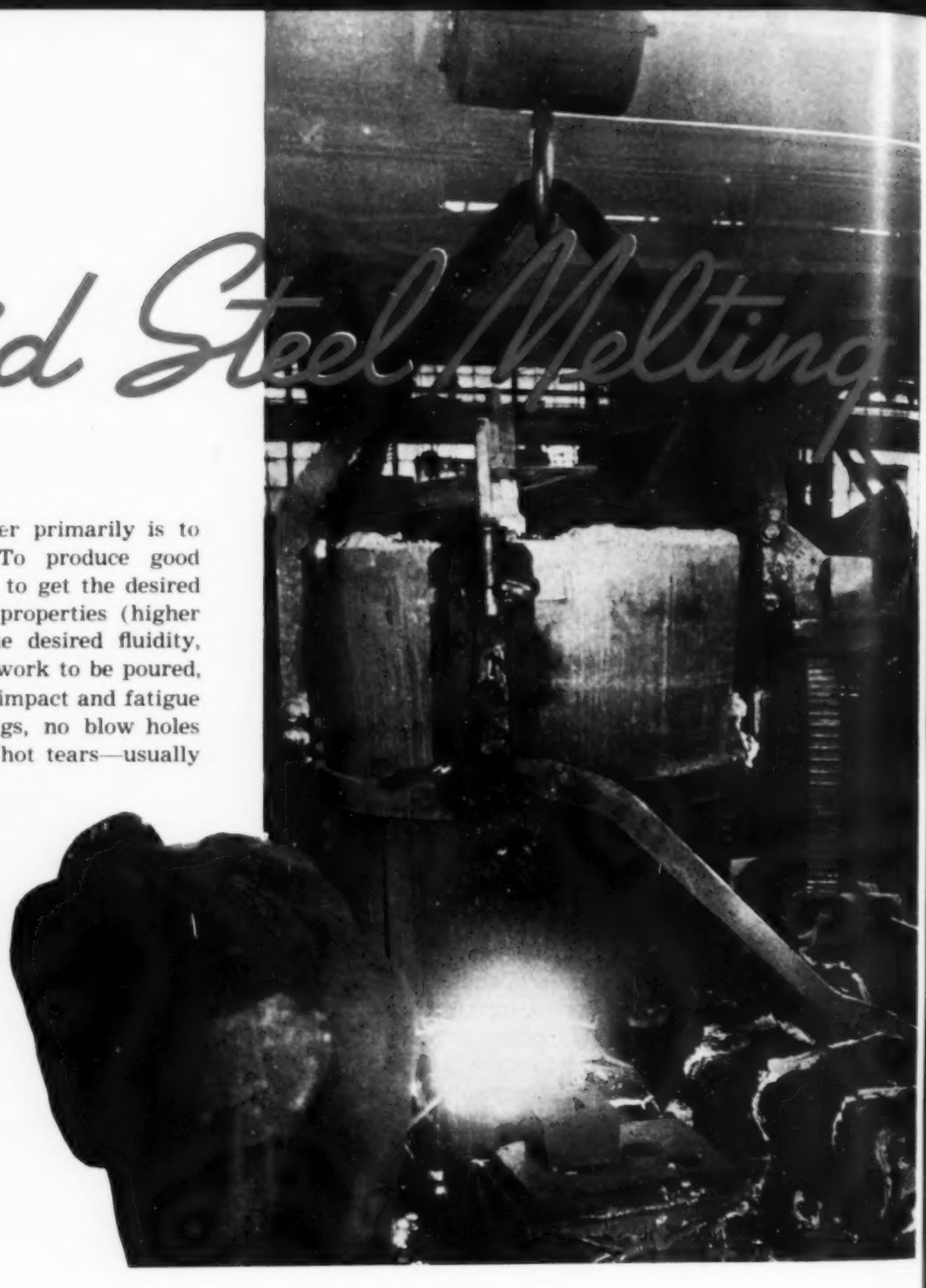
Where pure metals are to be stored, such as pure copper, pure lead etc., even these may differ, for example, there is a grade of copper called casting copper and other grade known as electrolytic copper. The composition of these two coppers is somewhat different and consequently if they are to be used intelligently they must be segregated in such a way that when one grade is wanted the copper used will be of that grade.

Secondary ingot produced by the ingot metal refiners comes in different grades and while in some instances each ingot is marked or it may be assumed they have sufficient distinction to give no trouble it is far better practice to have a definite bin for each different grade. Also be sure that everything associated with that grade goes to that bin for storage prior to being sent to the furnaces for melting into castings.

Therefore the designing engineer will realize that the metal room which provides the charges for the different furnaces must be of sufficient size to accommodate as many bins as may be deemed desirable to properly segregate the different kinds of metals. Provision should be made for an additional number of bins for future change and development in compositions being produced in that foundry.

When one realizes the change that is taking place in metallurgy as a result of the shortage of some types of raw materials or as the result of increased knowledge (*Please turn to page* 217)

Acid Steel Melting



AIM of every steel melter primarily is to produce good steel. To produce good steel he must endeavor to get the desired analysis, the desired physical properties (higher than specified if possible) the desired fluidity, taking into consideration the work to be poured, low inclusion content, helping impact and fatigue strength, homogeneous castings, no blow holes or porosity, and resistance to hot tears—usually blamed on the melter but sometimes the fault of casting design or the foundry due to restrictions from cores or mold. Further, there are at the present time a few demands to meet a desired grain size when so specified, and as time continues this demand may be increased, and therefore, all the more reason why consideration be given to more conclusive standardized features of melting practice.

The question has been asked why acid practice generally is used or preferred over basic practice for castings, excluding those compositions which, up to the present time at least, are produced best from the basic lined furnace. The principal item is cost. The life of the lining and roof used is comparatively longer than that of basic practice. It is cheaper in material cost, labor cost, and the cost of power consumed. The tonnage output is higher per working hours. The slag has a higher viscosity, making it easier in some cases to keep it out of molds. The metal is more fluid, which permits for a greater diversification in the class of work that can be produced.

Every foundry should make all heats to meet certain chemical and mechanical properties, even though the castings may be used in a product of its own. At least one test coupon should be poured from every heat and the results compiled as quickly as possible to enable the melting supervisor to better control his product.

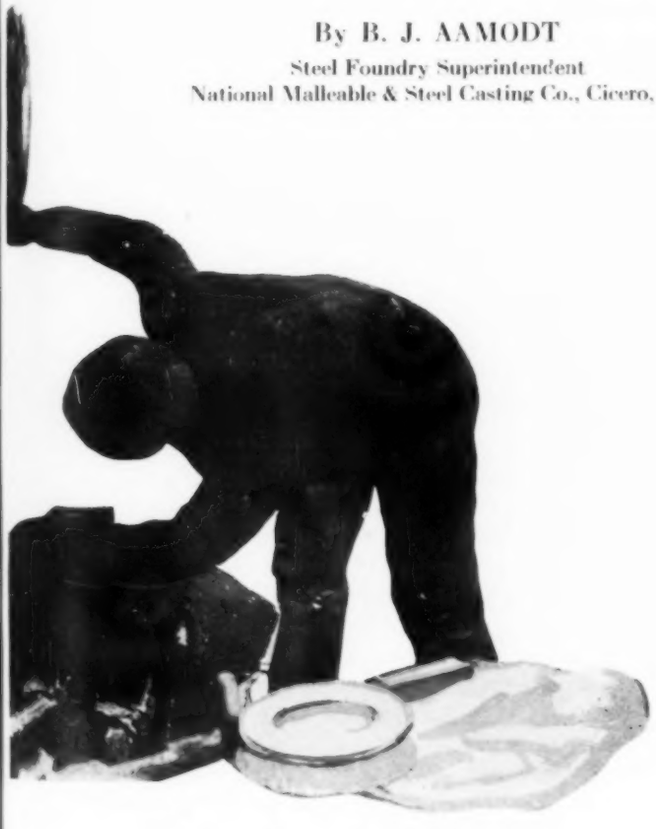
Test bars on certain specifications should be poured with the job requiring the specification, and not as has been done in some cases in the past where special heats were made from which test bars were poured to be substituted for those on the special jobs. This is just one of the reasons why steel castings from a specification standpoint have received in many instances the unfavorable criticisms directed toward them and our industry in general.

Before all heats are tapped, a porosity test of the metal should be made in a green sand mold, mainly for control purposes. The presence of a definite shrink in this test, and from its fracture, permits the melter to have a more definite idea as to its quality.

According to Dr. Herty, there are five general principles involved in the chemistry of steel

Practice

By B. J. AAMODT
Steel Foundry Superintendent
National Malleable & Steel Casting Co., Cicero, Ill.



making. They are: Solubility, reactions and equilibrium, diffusion and flotation.

In solubility the effort is made to get FeO into solution with the metal and remove the undesired residual alloys in the form of oxides. Solubility increases with heat. FeO dissolves in steel in proportion to the FeO in the slag.

The same applies to MnO and other soluble alloys in steel. The volume or weight has nothing to do with the amount or percentage of solubility, but the concentration of the soluble in the solvent governs the percentage of solubility.

An equilibrium is reached when the reaction proceeds with the same speed and in both directions. The application of heat will recover some of the Mn in a slag. The Si reaction is very much the same except two molecules of FeO are needed to complete the reaction. The carbon reaction is also the same but does not reverse itself as the carbon leaves the bath in the form of a gas. The value K or the concentration is a fixed value. If any part of the reaction changes, the equation must also change to equal K.

Diffusion is the rate at which the molecules in the slag and in the metal reach an equal concentration. The rate is governed by the concentration in either of them—the slag or the metal. It is proportional to the fluidity of the diffusing medium. A thick slag causes a slow rate of diffusion while a thin slag causes a faster rate. Agitation will speed the rate of the reaction. The FeO dissolves into the metal at the slag line. As the reaction proceeds the FeO concentrates lower into the metal. The proper procedure to speed or slow up any reaction in steel making is to work on the slag and not on the metal.

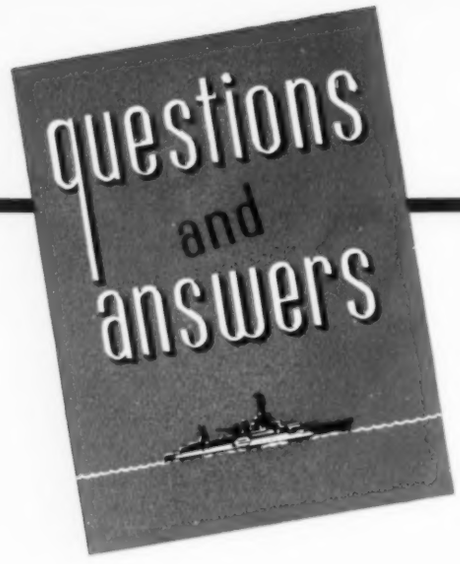
Flotation is the settling out of undesirable materials. This is a function of the particle size and the fluidity of the metal. The larger the particle the quicker it will rise to the top and become a part of the slag. Therefore, additions may be made to unite undesired particles into molecules increasing their size and quickening flotation. In the case of fine particles a fluid metal is desired to speed the action. Temperature increases fluidity and also governs the size of the particle.

In the acid slag the FeO content is not always an indication of its oxidizing power. An addition of CaO to free some of the FeO and SiO_2 from the slag will increase the oxidizing power. The function of the boil is the oxidation of C, Mn, Si. Silicon is the easiest to oxidize while carbon is the hardest. The oxidation of Si raises the temperature, increasing the rate at which the carbon will oxidize.

A bath of steel should be prepared for the solid state without an evolution of gas. Unless steel is deoxidized properly a reaction will take place evolving CO. Silicon will sometimes stop this reaction, as well as aluminum.

Hydrogen in steel causes blow holes because it increases the freezing rate. Both hydrogen and nitrogen have a strong tendency to supersaturate. They will stay in solution without forming bubbles, but in the presence of FeO the reverse of this is true. Aluminum additions to the ladle will lower the FeO content sufficiently to minimize the amount of hydrogen formed and therefore decrease vapor that causes blow and pin holes. Hydrogen and nitrogen can be removed by vigorous or prolonged boiling.

In carbon removal a much argued point is raised. One school of thought believes in removing all the carbon that is possible to remove and decarburize. The other school tries to remove the carbon to a point just below what is desired in the final analysis. The consensus is that it is not how low we can get the (*Please turn to page* 212)



Paint Swivel With Oil and Sand To Prevent Metal Adhering

We are making a small device in which one casting swivels inside the other. The male casting is made first and then placed in a mold for the second casting where the metal is poured around the end of the first casting. We shall appreciate advice on what material should cover the affected part of the first casting to prevent the second casting from adhering to the first either through heat or contraction. In the finished form the first casting must be free to move.

Swivel joint castings are made extensively, particularly in malleable iron foundries. Several materials have been used at various times, to prevent the female casting from adhering or gripping the first casting in a manner to prevent movement of the device. The almost universal practice at present is to dip the affected end of the first casting in linseed or other core oil, and then dip or roll the oil covered part in fine silica sand.

The coated castings are dried in the core oven and afterward placed in the molds made for the second casting. The only precaution necessary is to clean the first casting thoroughly before it is coated. Scale, rust or dampness will set up a commotion when the metal for the second casting is poured around the first casting and will produce blow holes in the second casting. The rattling action in the tumbling barrel will remove the film of sand and allow the first casting to rotate inside the second.

Desires To Remelt Ferrous and Nonferrous Chips and Borings

We are interested in remelting our iron, steel and bronze chips, and wonder how it could be accomplished without too much expense. We pour about 18 tons of iron a week and considerabily less bronze. Not all of the castings are machined, so that the expense of reclamation would have to be low. However, with the difficulty of obtaining scrap we would like to find some method of remelting our turnings. All turnings are kept separate.

Since you are handicapped by having a small amount of turnings available, you are wise not to install elaborate equipment for reclamation, unless you could obtain a plentiful supply from other plants nearby. Recovery of bronze turnings can be accomplished readily in your case by a simple remelting procedure which requires a little time. First step is to form a molten heel of metal in the bottom of a crucible several inches deep by melting down a few pieces of heavy scrap or similar material.

After the heel is hot and fluid, a small quantity of borings and turnings are added gradually without removing the pot from the furnace, stirring them well into the heel so that they are dissolved rapidly. Do not add so much of the fine material that the heel begins to solidify. After the addition, permit the metal to get hot and fluid again, and then repeat the addition of turnings. Follow the cycle until the crucible is full of metal and then pour into ingots.

In the case of the iron and steel turnings and borings, the simplest method of reclamation would be to fill the over-iron pig beds with them, and then pour iron over them. The iron of course, would not be hot enough to melt them, but it would tend to form an adherent mass which could be handled like any scrap. Another procedure would be to place a small quantity of the borings in the center of the iron charge in the cupola. Just what the recovery will be with that method depends on the cupola practice, and the better the practice, the higher the recovery.

First Iron of the Cupola Heat Too Cold To Run Castings

Please given a definition of kish and also state if kish is a direct cause of cold iron. In a recent instance the first five bull ladles of iron from the cupola appeared sluggish and would not run the castings. A graphitic carbon film formed on the metal after it solidified. Metal temperature about 2500 degrees Fahr. with the following analysis: Total carbon 3.45 per cent, silicon 2.70 per cent, sulphur 0.07 per cent, manganese 0.55 per cent, phosphorus 0.40 per cent. After the first five ladles the metal was quite satisfactory.

When iron is tapped from the blast furnace it is supersaturated with carbon and may be as high as 9 per cent. By the time the metal reaches the pig casting machine, the carbon content is about 4.50 per cent. A further loss of carbon occurs while the pigs are solidifying. Later, in the foundry a small amount of carbon is lost in the cupola. In all these losses, a certain amount of the free or graphitic carbon is forced out of solution as the metal becomes

lower in temperature. Some of this carbon floats in the air and the remainder impregnated with slag and iron floats to the top of the metal. Whether in the air as graphite flakes, or on top of the iron as a slushy crust, it is known in the foundry and around the blast furnace as kish. From the foregoing you will note that kish is not the cause of cold iron. On the contrary the cold iron is responsible for the kish. The cold iron in the first part of the heat was caused by some condition in the cupola, probably a wet or hard bottom. A bottom of this kind causes the first metal to boil with a resulting loss in temperature.

Break Iron Into Small Pieces For Charging Little Cupola

Within the next few months we expect to operate a small gray iron foundry. We shall appreciate your suggestions and advice on any and all phases of the proposition. Our cupola is 22 inches inside diameter, with four tuyeres in a circular windbox. The blast pipe is 7 inches diameter connected to a No. 3 blower. What is the proper air volume and pressure, weight of iron and coke charges, size of coke, best pig iron weight?

A cupola 22 inches inside diameter has a maximum rated melting capacity of 4500 pounds per hour, with 900 cubic feet of air per minute at a pressure of 6 to 8 ounces. Makers of blowers number the units according to an arbitrary system which is not uniform. Therefore your statement that you have a No. 3 blower conveys no information. One maker's No. 3 might correspond to another maker's No. 13. However, the diameter of the blast pipe, 7 inches, is approximately correct for your cupola.

Presumably therefore, the blower also is satisfactory. Name and address of makers of wind pressure and volume gages are presented in the advertising pages of THE FOUNDRY. The cupola will operate nicely with 125-pound iron charges and 15 pounds of coke between charges. The scrap should be broken into small pieces and the pig iron should not be over 6 inches in length. The coke also is small, approximately 2 inches.

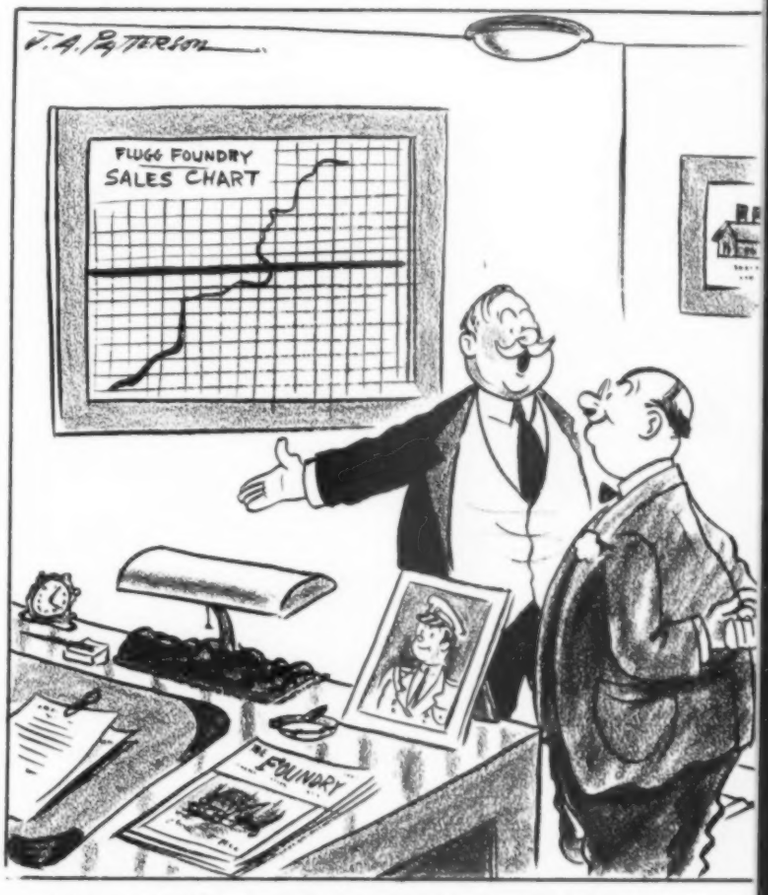
Thin Ears on Circular Castings Warp Slightly Out of Line

We are having warpage trouble with a circular cast iron plate 8 inches diameter, ⅜-inch thick in the center tapering to ¼-inch at four equally spaced ears 3 inches in length and 1½-inches in width. The casting is poured through a two branch gate between two ears. The castings are left in the sand for an hour, or until they are cold. The body of the casting remains straight, but the ears warp from a straight line approximately 1/16-inch.

The isolated thin ears cool before the main part of the casting and therefore spring slightly from a straight line when the remainder of the casting contracts. The simplest and easiest solution of the problem is to bend the ears on the pattern in the opposite direction. Then when the casting springs it will be straight. If you are using a matchplate, of course this will mean a new pattern, but a new pattern is cheaper than a lot of defective castings. In some instances of this kind, a slight manipulation of the ramming density effects a cure. The sand is rammed harder over the ears than over the remainder of the pattern. Attach four blocks to the squeezer head, one over each ear, 3 x 3 inches and 1 inch thick and leave the castings in the sand as you now are doing.

In another method, more applicable to single jobs, than to a whole floor of molds, the center of the casting on the cope side is stripped immediately after the iron has set. This will equalize the cooling speed of the entire casting. Naturally on a long order, or on a large floor, this would increase the labor cost. If the molds were on a conveyor the idea would be feasible. At a definite distance beyond the pouring station the molds would pass under a device equipped with a thin, hollow cylinder. The cylinder would descend to almost touch the casting. On the opposite move it would remove a sand core 4 inches in diameter after the manner of a sprue cutter. A small vibrator would rattle the sand out of it in readiness for the next mold. The foregoing of course is more or less theoretical. In the present instance we favor the idea of bending the ears on the pattern.

GANGWAY! By J. A. Patterson



"Things are taking on a better shape since we got that cast bomb shell order, eh Winthrop."

Make Porous Spots In Radiators

We are forwarding for your examination sample pieces from the cross bar of a cast iron radiator. Porous spots here and there cause the castings to leak when tested at 100 pounds per square inch water pressure. We shall appreciate your opinion on the probable cause of these defective areas, also the proper remedy.

The character of the defect indicates that it is caused by a slight boiling action in the metal. This boiling action may result from any one of the several causes to be determined only by a close, careful check on every item in the sequence of operations involved in making the mold and pouring the metal. The most probable cause is a hard or wet spot in the mold, gate or sprue. While passing this spot the excess steam enters the metal and chills a certain amount into a mass of small, and in some instances, microscopic bubbles.

The small amount of defective and porous material may remain in the vicinity where it is developed, or it may break apart to be carried in small particles by the flowing stream to other parts of the mold. The obvious remedy is to provide sand with a minimum moisture content uniformly distributed, that is a sand properly tempered. Wet spots in the sand may be caused by various forms of carelessness. A slight boil in some instances may be traced to sand tucked too hard under the bars, or to a point where the rammer came too close to the pattern. In other instances the boil is caused by a hard or unvented part of the core. In still other instances the blame may be laid on damp or rusty chaplets. In somewhat remote instances, the investigation may lead back to an improperly dried ladle lining, or to freshly patched ladle lip which causes the first iron to boil more or less before it enters the mold.

Facing Mixed With Iron Borings

To promote density without chill in certain casting sections we have heard that cast iron borings are mixed with the facing sand. We shall appreciate information on how to prepare this kind of facing sand.

Although not practiced extensively this shop kink of adding cast iron borings to facing sand has been employed at times to equalize cooling speeds between adjoining sections of heavy and light metal. In other instances the iron impregnated facing has been rammed in the sand teeth of a gear wheel mold to increase the skin hardness and the wearability of the gear teeth. For ordinary purpose the borings are passed through a No. 8 riddle to remove large particles. The resulting fine material to the extent of 10 to 12 per cent is added to the sand in the same manner that coal dust or any other ingredient is added. The combination can be mixed with the aid of a riddle and shovel, but a more uniform mixture can be obtained in either a paddle type mechanical mixer, or in a muller.

Improve Quality of Small Wheels

For our mine car wheels we melt a mixture of 300 pounds steel scrap, 500 pounds malleable pig iron and 200 pounds car wheel scrap and four 2-pound manganese briquets. We get a fairly good chill with carbon ranging between 3.00 and 3.20 per cent. Would a better wheel be obtained with a higher carbon and a lower silicon content. What relationship do these elements bear to the chilling characteristics.

Your present mixture produces an iron conforming closely to the analysis usually found in mine car wheels, with the exception of the manganese which appears to be exceptionally high. However, since the castings apparently are satisfactory and the chill is deep enough, you would be ill advised to change the composition of the iron. The subject of silicon-carbon relationship has engaged the attention of metallurgists for many years and has been discussed on many occasions in the pages of THE FOUNDRY and in papers presented before the American Foundrymen's Association.

The subject in its many phases and almost infinite ramifications is too extensive to attempt even a brief synopsis in the space at our disposal. From an elementary standpoint it may be stated that silicon is a graphitizer which to a large extent determines the relative proportions of free and combined carbon in the iron. In molten iron all the carbon is in the combined form. In the cooling stage, high silicon promotes the formation of high graphitic carbon, and conversely low silicon produces a high combined carbon content.

This condition is not as simple as it sounds. Temperature of the metal, rate of cooling, thickness of section, character of the mold and amount of other elements present in the metal, all affect the final result to a greater or lesser degree. In your particular case other factors enter to further complicate the issue. In molds where the body of the casting is made in green sand and the rim or tread formed in a chill, iron with ideal silicon-carbon for hardness, depth of chill and general wearability, conceivably might cause the castings to crack. All castings of that kind are a compromise between what might be desired and what may be within the range of practical accomplishment.

Produce Permanent Mold Castings

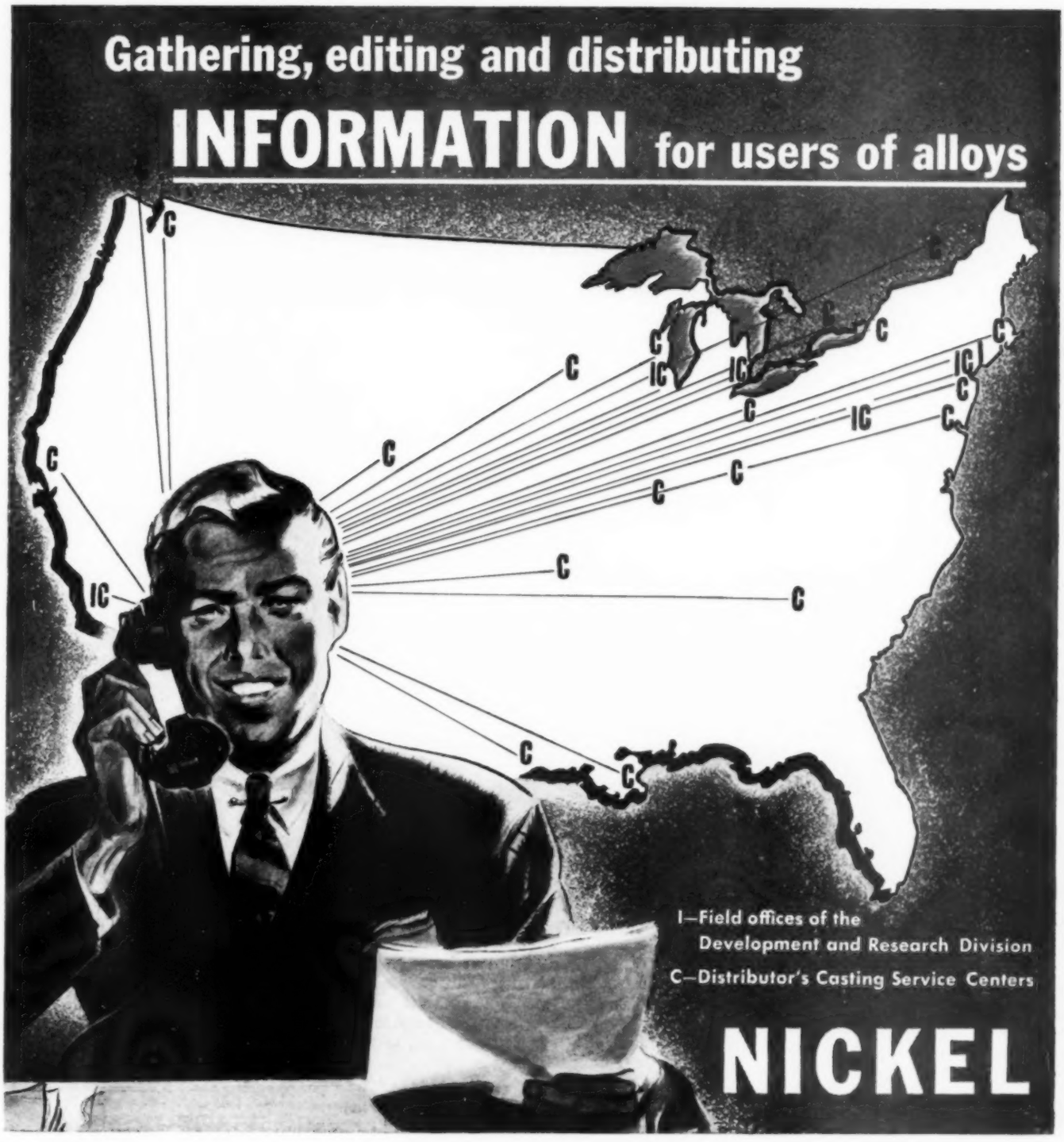
We shall appreciate greatly information on permanent molds, success of the process, cost and progress made in this branch of the foundry industry. Can you give us a list of foundries engaged in the work, also a bibliography of literature on the subject.

There is no question of the success of the permanent mold process for production of castings under a wide variety of conditions. As with any other process it is not universally adaptable to all castings. The process is in use in many foundries engaged in the production of gray iron, malleable iron, steel, brass, bronze and aluminum. Metal molds are used exclusively in die and gravity casting plants. Metal molds either bare or lined with sand are used where metal is cast centrifugally.

Probably the greatest advances in the adoption of this type of foundry practice is in the cast iron pipe shops where the pit type molds poured in a vertical position have been replaced to a great extent by horizontal molds in which the metal is poured centrifugally. Cost figures are not available, but since the process has been adopted so extensively, it is apparent that it has certain advantages. Literature on the subject is extensively available. A complete bibliography of titles would make a book. We suggest a study of the indexes of the *Transactions* of the American Foundrymen's Association, and of THE FOUNDRY.

For example during 1930 THE FOUNDRY presented 10 articles on permanent molds. Three chapters in *Gates and Risers for Castings* cover many interesting features of permanent molds for bronze, aluminum and malleable iron castings. The following list of references to articles that have appeared in THE FOUNDRY may serve your present purpose: June 1933, page 38; May 1932, page 18; May 1908, page 138; Sept. 1908, page 10; June 1909, page 203; Aug. 1909, page 303; Feb. 1910, page 237; May 1912, page 173; July 1917, page 274; Oct. 1, 1925; Jan. 15 Feb. 1, Feb. 15, March 1, 1926. Prominent foundries engaged in the production of small gray iron castings in permanent molds and described in back issues of THE FOUNDRY include the Eaton-Erb Foundry Co., Vassar, Mich., and the DeLaval Separator Co., Inc., Poughkeepsie, N. Y.

Gathering, editing and distributing INFORMATION for users of alloys



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men of industry

JAMES L. MAHON, for the past 30 years superintendent, Detroit plant, American Car & Foundry Co., and associated with that company since 1898, recently was appointed Detroit district manager. ROBERT CLADE was made works manager at Detroit and OTTO KELKE superintendent of foundries. Mr. Mahon entered the employ of the American Car & Foundry Co. on Sept. 26, 1898. He worked as car clerk, superintendent clerk, storekeeper, special traveling representative and on July 14, 1912 was appointed superintendent. He has been active in the work of the foundry industry at Detroit and served as president of the Detroit Foundrymen's Association in 1930. In addition to the various other civic, public and fraternal activities, he is an enthusiastic supporter of the Old Newsboys Goodfellow Fund, an organization of prominent citizens which raises a large fund each year for the amelioration of poor and destitute in the city of Detroit. In the December 1938 issue, THE FOUNDRY presented a photograph and appreciative tribute to Mr. Mahon in the role of No. 1 newsboy (president) of the Old Newsboys Goodfellow Fund.

♦ ♦ ♦

EARL E. WOODLIFF, for the past 5 years engineer with the Harry W. Dietert Co., Detroit, recently has organized his own foundry sand consulting service, with headquarters at 14862 Forrer street, Detroit. Mr. Woodliff was born in Concord, Mich. and was educated in the public schools of that city. He then attended Michigan State College, East Lansing, Mich. and following graduation became connected with the Saginaw Malleable Iron Division, General Motors Corp., Saginaw, Mich. Later he was with the Albion Malleable Iron Co. and then with the Packard Motor Car Co. He joined the H. W. Dietert Co. as engineer in 1937.

♦ ♦ ♦

THEODORE W. MONROE has been elected president, Hartford Electric Steel Corp., Hartford, Conn., and its affiliated company, Roxbury Steel Casting Co., Boston. GEORGE C. HAGSTROM, vice president and sales manager has been made executive vice president of the Hartford company, and continues as vice president of the Roxbury organization.

♦ ♦ ♦

R. L. MCILVAINE recently was made manager of engineering sales, the National Engineering Co., Chicago. Mr. McIlvaine has been associated with that organization since June 1941 and previous to that has had a broad background of foundry experince, both in foundry engineering and operation. He was graduated from the University of Illinois in 1925 and for the following year was cupola foreman, Griffin Wheel Co. From 1926 to 1930 he was associated with his father as foundry engineer, in the R. W. McIlvaine Co., Chicago. From 1930 to 1941 he acted as president of McIlvaine Foundry Conveyors Co., Inc. In 1933 he became associated with the Swayne Robinson Co., Richmond, Ind., as chief engineer and sales manager and resigned that position to join the National Engineering Co. He is a member of the American Society of Mechanical Engineers and the American Foundrymen's Association.

♦ ♦ ♦

HOWARD C. WALDRON has been appointed superintendent of foundries, Nordberg Mfg. Co., Milwaukee, succeeding JOHN H. CHAMPION, retired after 30 years with the company. Mr. Waldron is a vice president of the Wisconsin Chapter, A.F.A.

♦ ♦ ♦

JAMES BRINN recently has joined the Metal Division, Northwestern Iron & Metal Co., Lincoln, Nebr. Mr. Brinn was born and raised in Sweden, and graduated from the University of Upsala. Later he studied at the University of Frankfort on the Main, Germany. His practical experience includes operation of electric furnaces for the production of ferroalloys such as ferrochrome and ferrosilicon, both in Sweden and in this country. Later he was with the Westinghouse Electric & Mfg. Co., East Pittsburgh,

(*Concluded on page* 146)

Earl E. Woodliff

James Brinn

R. L. McIlvaine

George C. Hagstrom

Woodward

●●●▬

Uniform

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(*Concluded from page* 144)

Pa., as metallurgical engineer. For the past 12 years Mr. Brinn has served as metallurgist for Federated Metals Division, American Smelting & Refining Co., and L. A. Cohn & Bro., both of Chicago.

♦ ♦ ♦

ROGER WAINDLE has been released as sales manager by the Fahralloy Co., Harvey, Ill., to become connected with the Chicago Ordnance District of the War Department.

♦ ♦ ♦

R. C. WOODWARD, who has been chemist and metallurgist for the past year at Bucyrus-Erie Co., South Milwaukee, Wis., recently has been appointed superintendent of foundries of that company in addition to his duties as chemist and metallurgist. After graduating from Leland Stanford University, Mr. Woodward served 7 years as chemist and metallurgist at Lycoming Motors Corp., after which he was appointed to a similar position at National Brake & Electric Co., Milwaukee, a subsidiary of Westinghouse Air Brake, where he remained for 7 years.

R. C. Woodward

♦ ♦ ♦

F. H. STEPHENSON, formerly an engineer, Stockham Pipe Fittings Co., Birmingham, Ala., has been made foundry superintendent, American Blakeslee Mfg. Co. Division, American Casting Co., Birmingham.

♦ ♦ ♦

DONALD D. KENNEDY recently was appointed chief of the Castings Unit, Iron & Steel Section, Office of Price Administration, succeeding J. E. McDonough, who has been called to active service in the army. Mr. Kennedy, whose unit includes supervision of gray iron, malleable iron, steel, manganese and high alloy castings, formerly was with the University of Newark, Newark, N. J. Since 1937 he was head of the department of accounting, director of courses in management, educational supervisor for accounting courses under the engineering, science, management, defense training program under the U. S. Office of Education, as well as holding the same position for the Newark College of Engineering, where he taught. He also served as director of publications for the Newark Chapter of Cost Accountants. Prior to his association with the University, Mr. Kennedy spent 7 years as head of a department of business administration, Clarkson College of Technology, Potsdam, N. Y. Previous to that he taught at the Wharton School of Commerce, University of Pennsylvania, and the University of Pittsburgh, Pittsburgh.

♦ ♦ ♦

GEORGE D. BRANSTON, director, vice president and secretary, Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich., has resigned from the company and its subsidiaries due to ill health.

♦ ♦ ♦

THOMAS D. WEST II, formerly foundry superintendent, Symington-Gould Corp., Rochester, N. Y., has been appointed consultant of steel foundry activities, Deere & Co., Moline, Ill. He was graduated from Case School of Applied Science, Cleveland, as a mechanical engineer in 1930 and then worked at the Cleveland Tramrail Division, Cleveland Crane & Engineering Co., Wickliffe, O., in the iron foundry. Later he joined the West Steel Casting Co., Cleveland, which position he resigned to become connected with Symington-Gould. Mr. West is a member of the A.F.A. and A.S.M.

♦ ♦ ♦

BENNETT BURGOON JR., formerly mechanical engineer, Railway Steel Spring Division, American Locomotive Co., has been appointed district representative in western Illinois and Iowa for the McKenna Metals Co., Latrobe, Pa. His office is located in Rockford, Ill.

♦ ♦ ♦

H. J. FRENCH, International Nickel Co., New York, recently has been appointed senior technical consultant in charge of the Metallurgical and Specifications Section, Iron and Steel Branch, War Production Board, Washington.

Martin Fladoes

Elected president of Sivyer Steel Casting Co., Milwaukee, as mentioned in the March issue

Supplies Advice on Iron Castings Use

To co-operate more closely with the national war effort, the Gray Iron Founders' Society is arranging to supply expert technical advice on the use to which gray iron castings can be applied in maintaining rigid conservation of materials necessary to the war economy.

The society has secured the services of A. J. Edgar who until recently has been in charge of the gray iron, steel, and nonferrous foundries of the General Railway Signal Co., Rochester, N. Y. Mr. Edgar was graduated in mechanical engineering and metallurgy from the Michigan State College in 1932. He then entered the service of the Saginaw Malleable Iron Division of General Motors Corp., Saginaw, Mich., where he worked in all departments of the foundry. His next service was with the Steel Sales Corp., Chicago, where he was engaged in distributing the products of the International Nickel Co., and in promoting and developing cast irons.

A. J. Edgar

Mr. Edgar will serve on the staff of W. W. Rose, executive vice president of the society at the society's Washington office, 1719 K street, North West, where he will be available to assist in every way the authorities of the War Production Board in determining to what extent gray iron castings safely can be employed in reducing bottle necks as they develop in other and scarcer materials and the full utilization of gray iron foundry capacity made available by the many limitations placed upon civilian consumption to conserve material needed in the war effort.

A group of castings important to war production will be shown at the Hercules Exhibit, Booths 57 and 59, Foundry Show, Public Auditorium, Cleveland, April 20-21.

Here you can learn at first hand how Truline Binder makes MORE sound, smooth castings... FASTER... and at LESS COST. You will see interesting techniques in a variety of metals... grey iron, malleable, cast steel, aluminum, magnesium, and bronze.

Hercules service men will be on hand to give you exact data . . . *facts* about the performance of Truline Binder taken from its successful use in many foundries.

If you cannot visit the show, clip the coupon to your letterhead and mail it today. We'll see that you get full information, and a sample if you want it.

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among Detroit foundries

By A. H. ALLEN
Detroit Editor,
The Foundry

STEEL castings and more steel castings is the cry directed toward the foundry industry today. In the gray iron branch, the greatest demand is for castings to be used in the production of machine tools and other machinery and equipment. In that direction a definite lack of capacity seems to exist. Small gray iron jobbing foundries specializing in machinery castings generally are loaded to their capacity, with orders on hand in some instances sufficient to require full operation for 1 or 2 years. A manufacturers representative, needing a fair lot of heavy iron castings ranging from 3 to 10 tons in weight, recently scoured Detroit for a gray iron foundry with sufficient available capacity to produce the work. He was unable to find a source of supply for the reason that capacity either was booked solid or the equipment was not sufficient to handle heavy castings.

The production shops of the motor companies are studying the steel picture closely to determine whether present facilities can be turned to production of steel castings or new plants must be built.

Ford's armor plate foundry is taking shape rapidly and will be turning out enormous quantities of tank castings before many months have passed. Four new cupolas, two of them hot-blast, will be linked with four converters and four electric holding furnaces to supply metal for castings.

Production of steel by blowing down cupola metal in the converter is a leading subject for discussion by foundrymen hereabouts. Economy and speed of the cupola-converter combination are important advantages. Acceptance of desulphurized converter steel of suitable phosphorus content for use in castings for war equipment appears uncertain at present in view of the insistence of some military services on steel castings produced by other melting methods. Transfer of the steel from the converter into an electric furnace seems to overcome objections, although the reason is not quite clear. Such electric furnaces usually are acid lined and hence are not suitable for dephosphorizing. While sulphur and phosphorus can be reduced to desirable limits in the basic lined electric, or in the basic lined converter, production of steel by the basic process is more involved and requires much more time.

Another thing which makes the matter of phosphorus increasingly critical is the steady decline in quality of scrap to be used in production of steel for castings. One electric furnace operator reports heats analyzing as high as 0.40 per cent phosphorus before refining. Quantities of stove plate and other low-grade material which is high in phosphorus are "contaminating" the customary high-grade type of low-phosphorus plate scrap used for electric melting, and, together with increasing tightness in low phos pig iron, are giving operators cause for contemplation of methods to eliminate phosphorus from molten metal.

Wheeling Steel Corp. uses the patented Yocum process for dephosphorizing steel and it has been the subject of some investigation by interests in Detroit. It involves the use of 50 per cent impure lime, 20 per cent fluorspar, and 30 per cent roll scale to oxidize phosphorus into a fluid slag. Chief objection which has been voiced is that the process is somewhat "messy."

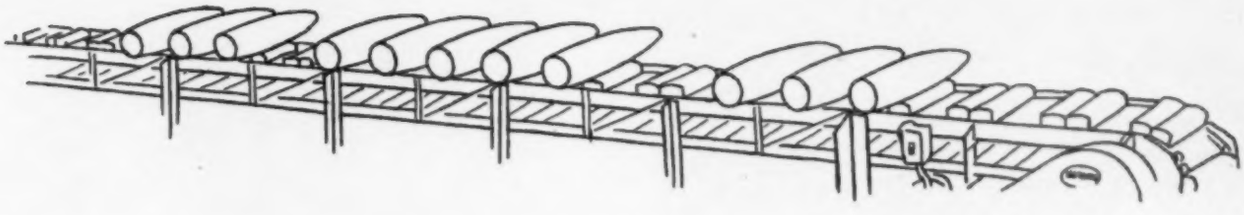
In the South, where high phosphorus content of iron ore has made dephosphorizing a routine matter for a good many years, a somewhat different method is practiced. From information supplied by V. A. Crosby of Climax Molybdenum Co., it may be summarized briefly as follows:

Hot metal from blast furnaces is

Concluded on page 150)

New all-cast, rivetless, M-4 medium tank at the right will be ready shortly for tests at Ft. Knox, Ky. This 30-ton unit is lower and more streamlined than its riveted steel-plate counterpart, M-3, at the left. Installation of 4000-pound cast steel turrets and hulls on medium tanks was begun late last year. Armament will include a 75 millimeter cannon and machine gun. NEA photo

AN ARMY TRAVELS ON ITS SUPPLY LINES



. . SO DOES PRODUCTION

● If a modern army is to attain any measure of success, it must have complete and fast-moving lines of supply backing it to the limit. Likewise, high speed machines, turning out shells and guns, planes and tanks, must have supply lines to keep them producing. In America's great plants today where war materials are made, Mathews Conveyers are keeping parts and assemblies flowing to and from machines with speed and control. It's a Mathews job to keep vital material moving.

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ELLWOOD CITY, PENNSYLVANIA

If you are manufacturing war material, or anything vital to the success of the war effort, you can get Mathews Conveyers to handle that material. Rely as usual on your Mathews Engineer.

MATHEWS CONVEYERS FOR MECHANIZED PRODUCTION

(*Concluded from page* 148)
transferred by mixer cars to 25-ton bottom-blow bessemers in which manganese and silicon are blown down to less than 0.20 per cent (a prerequisite to phosphorus reduction) and carbon is blown down to whatever is desired in the finished steel. The steel then is poured into ladles which take it to 175-ton tilting, basic open-hearth furnaces. To start a "dephosphorizing sequence" in the open hearth, 20,000 pounds each of Alabama iron ore and 90 per cent, burned limestone are added to the metal charge to form an oxidizing slag. Then about 25 tons of high-blow (high carbon) bessemer steel is added to stimulate boiling.

After 10 minutes of boiling, the phosphorus content of the steel has been reduced from 0.90 per cent to around 0.10 per cent. The furnace then is tilted and the slag poured off. Immediately a finished slag is added by charging another 40,000 pounds of the ore-limestone mixture. Another 30 minutes of boil reduces phosphorus content from 0.10 to 0.025 per cent and the heat is finished. The furnace is titled in the opposite direction and the steel tapped out, all but 25 tons. A skimmer bar holds back the slag which is then used as the initial oxidizing slag for the subsequent heat to be dephosphorized.

Some steel is left in the furnace because it has been found that the end of the heat will rephosphorize rapidly for some reason if it is tapped out.

The first slag from each heat contains about 15 per cent phosphorus pentoxide, a valuable fertilizer material. The slag is pulverized and sold to fertilizer manufacturers, bringing $3-$5 per ton and adding considerably to the economy of the process. Actual time of phosphorus oxidation from the preceding comment can be figured 40 minutes, but total time from tap to tap is roughly 2 hours—a fairly rapid dephosphorizing of 140 tons of steel.

It is not necessary to hold down carbon content to dephosphorize, the treatment being entirely successful on metal with as much as 3 per cent carbon.

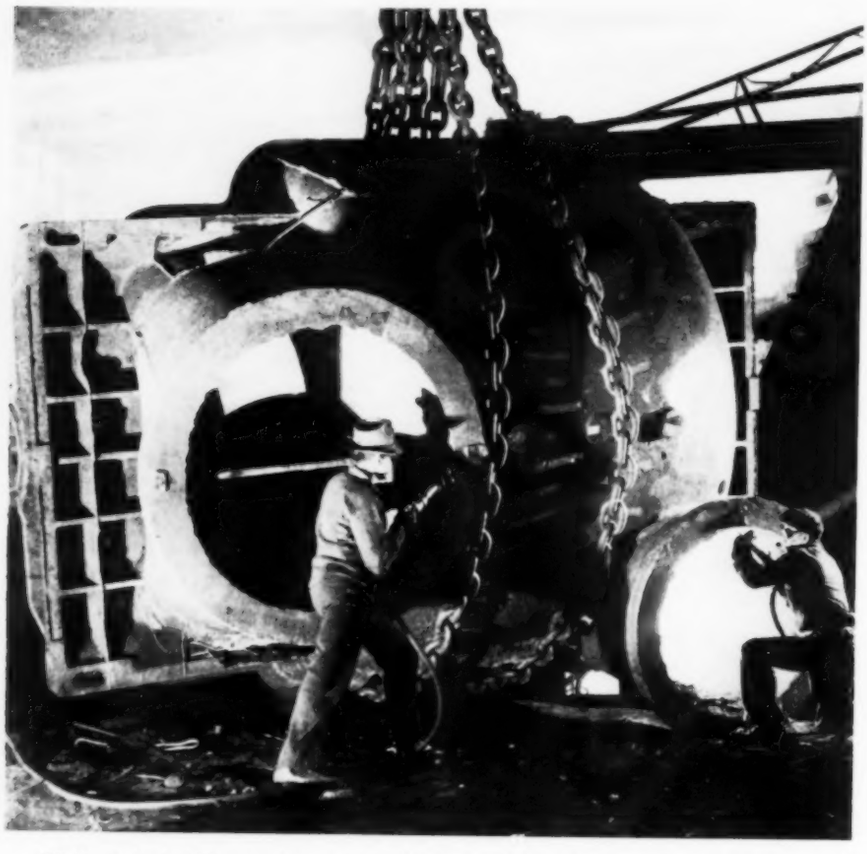
A local steel company is considering installation of cupola equipment to supply hot metal for basic electric furnace refining. Electrics are now operating on scrap, but difficulties are increasing in obtaining suitable quality and quantity of scrap material. In operation of electric furnaces, most of the power requirements are concentrated in the so-called melt-down stage, rather than in the subsequent refining stage. By charging cupola hot metal, the melt-down stage would be eliminated entirely.

Reports are heard of plans to construct new magnesium foundries to be operated by two of the larger motor companies to reinforce the needs of aviation engines for light metal castings. Locations do not appear to have been specified as yet.

Unconfirmed reports also have been circulated of proposals to erect two new steel foundries in the Detroit area for production of large armor castings for tanks.

Lakey Foundry & Machine Co., operating two gray iron foundries, hitherto largely devoted to automotive castings, is rearranging facilities in one plant for production of steel castings.

Production of iron castings is being continued with no decrease in capacity, although naturally the type of castings being produced has changed following suspension of automobile production.



While it took 470 man hours to make the mold for this casting, it took just 90 seconds to pour the 60,000 pounds iron to make this lower half of an Allis-Chalmers Mfg. Co. blast furnace blower casing. The blower will provide forced air for one of the nation's big steel mills now busy turning out armor plate. Photo courtesy Allis-Chalmers Mfg. Co., Milwaukee.

Graphite Flakes Are Shown on Chart

The American Foundrymen's Association, 222 West Adams St., Chicago recently has published a wall size chart of the A.F.A.-A.S.T.M. Graphite Flake Classification in Gray Cast Iron. This classification chart contains not only reproductions of typical fields showing the 8 graphite flake sizes contained in the practice, but also the 5 types of graphite. In addition it contains directions for the selection of specimens, polishing, preliminary examination, estimation of flake size, use of calibrated oculars in determining flake size, and proper method of recording gray iron graphite structure data.

The information presented in the chart is from a tentative recommended practice for evaluating the microstructure of graphite in cast iron, which was adopted as tentative at the 1941 annual meeting of the A.S.T.M. with the designation A 247-41T. It is pointed out that the present tentative recommended practice is not to be considered a specification.

The wall graphite classification chart may be obtained from the A.F.A. at a cost of $1 to members and $2 to nonmembers.

American Iron and Steel Institute, 350 Fifth avenue, New York, recently has issued an 143-page booklet entitled, "Possible Alternates for Nickel, Chromium and Chromium-Nickel Constructional Alloy Steels". Cost of booklet is 50 cents.

PRACTICAL DATA FOR PRESENT PROBLEMS

Here are two books designed to help users of Molybdenum steels and irons to conserve all alloying elements, and possibly steel and iron, by getting the most in the way of strength, toughness and wear resistance with the lowest alloy content.

"MOLYBDENUM IN STEEL" covers the fundamental metallurgy of Molybdenum steels. Heat treatment – physical properties – applications – of a number of these steels are treated at length.

"MOLYBDENUM IN CAST IRON" covers the effect of Molybdenum in gray iron, giving suggested analyses for practical applications and detailed discussion of high strength (60,000 p.s.i. and up) irons.

Both books will gladly be sent free on request.

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MOLY

the adventures of Bill

BY PAT DWYER

Drawings By RICHEY

WELL Sir," said Bill the other night, "I had the rare privilege one day last week of looking through a new book on machine shop practice. It was printed in the United States and edited by a prominent professor in one of our educational institutions. The text was written by a half dozen or more authors, whose names I regret to say never before have come to my notice. Nothing extraordinary about that, you might say, since at a modest calculation there must be millions of men whose names I never have seen, especially the names of men who write in foreign languages."

"Do you mean to say this book is in a foreign language? And when pray, did you learn to read books of that kind? I have known you for many years and this is the first inkling I have had that you could read or speak any thing but the native tongue in which you were born. According to our records the early Apostles had the gift of tongues whereby a message broadcast in their native language, readily was picked up by all classes of hearers in *their* language. However, you will pardon me if I cannot see ear marks or other apostolic qualifications in you or for that matter in any other foundryman. 'Tis true shop language at times seems to indicate a certain degree of familarity with the Deity and His works, but that, as I have gathered in a general way, is not confined to the foundry. Finally, what possible interest could you have in a book on machine shop practice? Are you by any chance looking up alibis for use when the finicky machinist chalks an impudent N.G. on one of your castings?"

"You remind me," said Bill, "of one of these here now lawyer fellows who insists that a witness answer yes or no to a string of questions as long as your arm and with more twists and turns in it than the Burma road, in a snake with the stomach ache, or in the mental equipment of the high command in certain countries headed for the dog house."

"The dog house, eh? A very appropriate place indeed for those—"

"Just so," said Bill, "but you must not say it. Only a few authors of popular fiction enjoy the privilege of rooting around in sewers and cess pools and dredging up putrid morsels and spreading them on the printed page."

"I had no intention of using the word. I just pulled up in time."

"'Tis a great pity the people responsible for this machine shop book did not pull up in time. For some mysterious reason they stuck in a chapter on foundry practice. I have been in and out of machine shops long enough to gather a general idea on the machines and the manner in which they are operated. I would not attempt to pose as an expert, therefore I have no comment to make on the machine shop section of the book. However, I think I am justified in modestly laying claim to some knowledge of American foundry practice and the ability to criticise offerings either in the oral or written form.

"The foreword to the foundry chapter claims that a general knowledge of foundry practice will benefit the machinist and then handsomely admits that the treatise to follow does not cover the field completely and in detail."

"Well," I inquired, "What is wrong with that? I know of many instances where a little knowledge of foundry practice on the part of the machinist would have prevented a great deal of highly unparliamentary and actually hostile language."

"Little is right. If the machinist knew nothing of foundry practice before he reads this particular chapter, he will know even less after he reads it."

"How can he know less than nothing?"

"Because my dear young downy friend the dope in the book is all galley west and c r o o k e d. The methods described are not American methods, the rigging and other equipment shown in the illustrations are not American and finally many of the terms scattered through the book are not in use on this side of the ocean. For instance what is a cod?"

"A cod. Why, a cod is a fish. Every person knows that. Some people eat them. Years ago every magazine and newspaper carried a picture of a stalwart fisherman in oil skins and sou'wester with a huge cod fish on his back, suspended by a rope over his shoulder. I have seen—and smelled—cod on numberless occasions and now and again I have jigged a dozen or more. One of the by-products of the cod fish industry is oil squeezed out of the livers and spilled into the stomachs of innocent children. A horrible, pale, sticky dose, probably the most intensely nauseating item in the entire list of repulsive materials. According to all accounts the modern product is passable, but down to this day the sight of an old time bottle causes my stomach to contract involuntarily and get set for the high dive."

"You mean the high jump or the pole vault. Is that all you know about the cod?"

"Well," I said, "If you want to go back far enough I have seen the word in some of the works of the late Mr. Shakespeare. I am referring of course to the original or un-

(*Continued on page* 154)

Gaffer kindly tells him what to do

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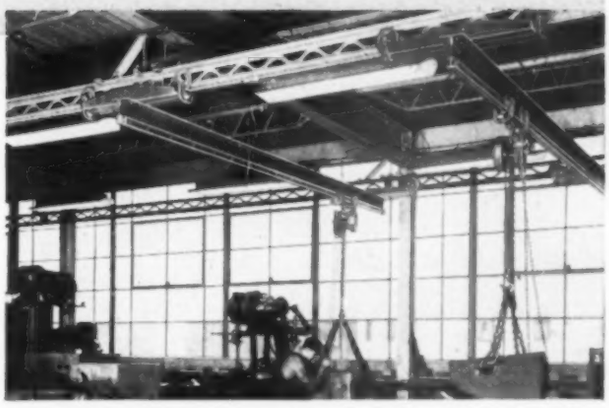

● Light duty cranes with chain hoists solve the problem of handling heavy castings.

● Easy movement of hard-to-handle loads on a simple power operated MonoRail crane.

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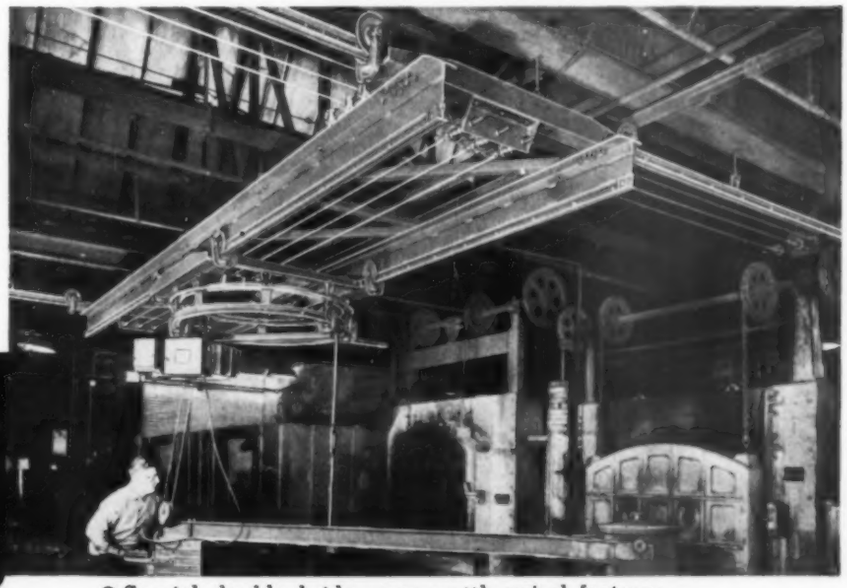
The complete facilities of our engineering staff are at the disposal of any company—their architects or engineers—planning to expand or construct new buildings. This service is yours for the asking.



● Special double bridge crane with swivel features for quick removal and quenching annealing pots.

(*Continued from page* 152)

expurgated version where many words indicate that the eminent author had a fair working knowledge of the tap room vernacular. If I am not too inquisitive, if you are not under a vow of silence, or if you are not violating any act for the defense of the realm perhaps you will be kind enough to clear up this cod mystery. Incidently, have you ever heard or seen the rollicking sketch describing a famous trial where the defense lawyer stumped an opposition witness with the simple question 'How many fins has a cod?' "

"Well," said Bill, "I'll tell you. I don't know if a cod has one fin or 40 fins or if he sculls himself along with his tail. Who cares? However, I do know that cod is not an American foundry term. This author I am telling you about uses the word to describe any projecting body of sand left by the pattern in a mold."

"Maybe he was codding, or kiddin' as we say over here in our uncouth colonial manner."

"Not this lad. He is as serious as my old uncle Malachi talking about the good owld days when he and Shawn O'Farrell carried pikes over their shoulders and drilled down by the singing river at the rising of the moon.

"In the foundry industry, loam molding is regarded as one of the higher branches in the art and science of producing castings. The work is carried on only by men of special skill and experience. In our author's opinion it is only child's play. A spindle is set up, a brick wall is built and mud is daubed over all the surface. Nothing to it. To make the stuff stick to the bricks it is mixed with cow hair and horse—"

"Whoa!" I interrupted in alarm. "I am no white wing. Let us get back among the green sand boys. Has the author anything to say about sand and its preparation?"

"Does he? And how! Most of the molding sand is mixed by hand with shovels, but in some foundries, he admits that the sand is prepared in a mechanical type mixer. Fig. so and so shows *the* mixer. Not one of the present wide range, but *the* mixer. I saw one of these machines in an eastern foundry about 40 years ago, but in all the 5000 foundries in North America, I doubt if there is one of these mixers in use today. I don't know where he found the picture.

"With probably thousands of foundrymen in this country competent to write a chapter on foundry practice, I cannot understand why the work was entrusted to an author who apparently never saw an American foundry, or ever read an American publication. In fact he is not familiar with modern practice in his own country. From the evidence submitted I do not think the author is a foundryman. If he is he should brush away the cobwebs and creep out of his shell now and again.

"If the author had written the treatise for his own amusement, or as a description of dead and forgotten foundry practice, I would be the last person to elevate the eye brow or point the finger of scorn. But to present this pathetic composition, in a book compiled, edited and published in this country, presumably for American readers, really is a little too, too.

"He is away off the beam in his references to core binders, facing (lamb black if you please) flasks, odd sides, gates and risers, cores, patterns, molding machines, permanent molds, ladles, cleaning castings, and practically every other item. Cores for aluminum are made of saw dust and rosin. Malleable molds are faced with cement and plumbago. Over iron in the ladles is poured back into the cupola (Some trick, hey?) Surface of chills should be rusted to make the blacking stick. The best place to rust them is in the out door lavatory. Aluminum is stirred vigorously before it is poured. Description of the cupola is a gem, solid bottom, blast pipe under the floor, two swinging tuyeres and a fettling door at the back. The whole thing, as my old friend Jock McBain, frae Glesga used to say is fair peetifu.

"Solid bottom cupolas are melting and have melted perfectly satisfactory iron, but what is the use of talking about them to American readers, in a country where the last solid bottom cupola disappeared with the Great Auk.

"Talking about solid stuff reminds me of a letter I had the other day from a man who has trouble with solid slugs 6 inches diameter and 9 inches in length. He tried several forms of gates and risers, used fluxes to clean the iron and covered the riser with an anti piping compound. The cupola mixture contains 40 per cent No. 1 pig and 60 per cent machinery scrap. Despite this practice the loss is high through shrink holes and dirt in some instances 2 inches deep in the top of the casting.

"The sketch which accompanied this inquiry showed an ordinary gate near the top, a long straight gate set at a slant to enter the mold near the bottom, and a long curved or horn gate with the outlet near the bottom of the mold. One style of riser the full size of casting is connected to the top by a neck 3 inches in diameter. A second riser is connected to the side at the top. The sketch also shows a defective area

(*Concluded on page* 201)

Fifty lead slugs and fifty volumes Ye Olde Farmer's Almanack for the correct answer. No prompting please

SAVING IN FOUNDRIES ACROSS THE NATION

Superior core and mold ovens in foundries from coast to coast are important factors in cutting production time, reducing core and mold rejects, increasing the percentage of good castings and lowering heating and foundry production costs.

Those foundries operating Young Brothers ovens have testified to every-one of these important results and this is verified by correspondence with the home office.

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Today, fast grinding of castings determines the speed of our war effort . . is a deciding factor in shortening the war. Only grinding wheels of highest quality can be trusted to turn out the kind of jobs we must have for victory.

Hundreds of foundry men have the Sterling Catalog No. 40A in their files. They find it a handy, complete listing of types of wheels . . send for it today.

Regardless of the type of casting, there is a Sterling Grinding Wheel specification to help you speed up production and turn out better work. Also by using the proper Sterling Wheel, you will find it will last longer, thereby lowering costs.

Sterling engineers are ready to help you plan for better grinding . . . just write us a letter today, and a conference can be quickly arranged at no obligation, of course. This is our contribution to victory . . take advantage of it!

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THE STERLING GRINDING WHEEL DIVISION
OF THE CLEVELAND QUARRIES COMPANY
TIFFIN, OHIO

THE WHEELS OF INDUSTRY

Birmingham STAGES TENTH ANNUAL CONFERENCE

TENTH annual foundry practice conference of the Birmingham District Chapter of the American Foundrymen's Association, held at the Tutwiler Hotel, Birmingham, Ala., Feb. 19 to 21, featured the consideration of problems brought to the industry by the present war emergency. In addition to the technical sessions and a luncheon and a banquet, two mornings were devoted to a plant visitation program arranged by a committee with J. A. Woody, assistant works manager, American Cast Iron Pipe Co., Birmingham and H. A. Newbury, president, Newbury Mfg. Co., Talladega, Ala., as co-chairman.

Pleads for Co-operation

The first technical session, at which C. S. Whittet, metallurgist, National Cast Iron Pipe division of Jas. B. Clow & Sons, Birmingham, Ala., presided, was devoted to a paper "Melting Units for National Offense" by Donald J. Reese, metallurgist, International Nickel Co., New York. Mr. Reese pointed to the urgent need for a broad understanding between the various branches of the foundry industry. He indicated there is no marked point of demarcation between gray iron, steel, and graphitized malleable iron, and stated that the national war effort as well as the foundry industry would benefit greatly if those working in any part of the industry were familiar with the problems of the other branches. In striving for better methods and better products, the industry should not fail to explore the full possibilities of old processes. These processes and their producing equipment should not be thrown into the discard without full consideration of their merit.

Mr. Reese spoke of the revival of the cupola-converter process for making steel and stated that the success of this method lies in the following: 1—Synchronizing the melting rate of the cupola with the refining or conversion rate of the converter; 2—In operating the cupola so that its product is of uniform chemistry and high in temperature; 3—That certain converter techniques are kept within limits. The speaker gave detailed information as to the cupola charge in melting metal for the converter and listed the favorable and unfavorable factors of the process. The remainder of his talk was devoted to consideration of various types of duplexing in which cupola plays an important part. Mr. Reese's paper is to be presented in an early issue of THE FOUNDRY.

How To Get Contracts

Harry G. Mouat, secretary-treasurer of the Birmingham District Chapter of the A.F.A., presided at the luncheon meeting on Thursday. Hon. J. W. Morgan, City Commission, Birmingham, welcomed those attending the convention to the city of Birmingham.

Maj. Frederick W. Hausmann, Birmingham Ordnance District, spoke on "Ordnance Procurement". Major Hausmann indicated the progress that has been made in increasing the power of the local ordnance districts and stated that contracts up to $1,000,000 now can be negotiated by the ordnance districts without referring the matter to Washington. He stated that while local war production has been exceptionally heavy, the big load is yet to come in the near future. Major Hausmann spoke of inspection and stated that there was no reason why this inspection should not be tight. He discussed the difficulty of getting into production after securing contracts, the problems of financing, and outlined some of the war materials being produced in that district by foundries. The speaker advised all foundrymen to get acquainted with ordnance officers in their respective districts.

W. Lee Roueche, McWane Cast Iron Pipe Co., Birmingham, Ala., presided at the first afternoon session, which featured a paper "Sand and Sand Control" by E. E. Woodliff, Harry W. Dietert Co., Detroit. Mr. Woodliff stated that no two foundries have identical problems and therefore those problems which concern sand must be considered individually. He stated that it is of prime importance to have a man in charge of the sand who has initiative and who has the ability to utilize the data available to foretell troubles before they develop. While sand has many variables, when properly controlled it becomes a fine working tool. Poorly conditioned sand works hardships on the management and on the molder. Asking a molder to work on sand varying from day to day in its various properties is not conducive to high production of good castings.

Factors to be taken in consideration in the control of new sand, according to Mr. Woodliff, include fineness for proper grain size, permeability, ample clay content, and ability to withstand high temperatures. The speaker warned that in the foundry those in charge should practice sand control and not sand testing. Accumulating data from numerous tests is useless unless that information is used to control the uniformity of sand used in the shops.

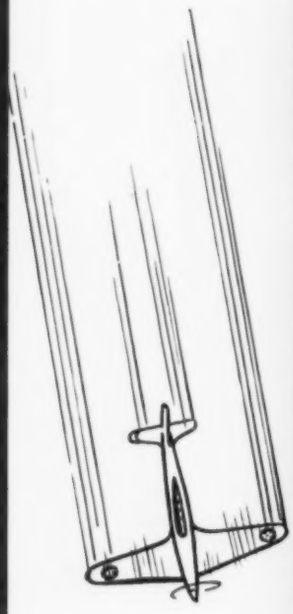
Study Sand Data

Molding sand changes gradually in use and if the sand data is not studied over a period of time, trends may not be seen and corrective measures may not be applied in sufficient time to prevent considerable trouble. Mr. Woodliff discussed the sintering point of sand and stated that new sand has the highest sintering point. As this sand is used, the sintering point moves downward. The speaker discussed bonding materials, hot strength tests, and a wide variety of other problems pertaining to the use of sand in the foundry.

Ray L. Farabee, professor of metallurgy and mechanical engineering, University of Alabama, presided at the second technical session on Thursday afternoon when Robert E. Kennedy, secretary, American Foundrymen's Association, Chicago, presented an interesting paper "Foundrymen's Position in National Defense". Mr. Kennedy stated that the foundry industry is one of the

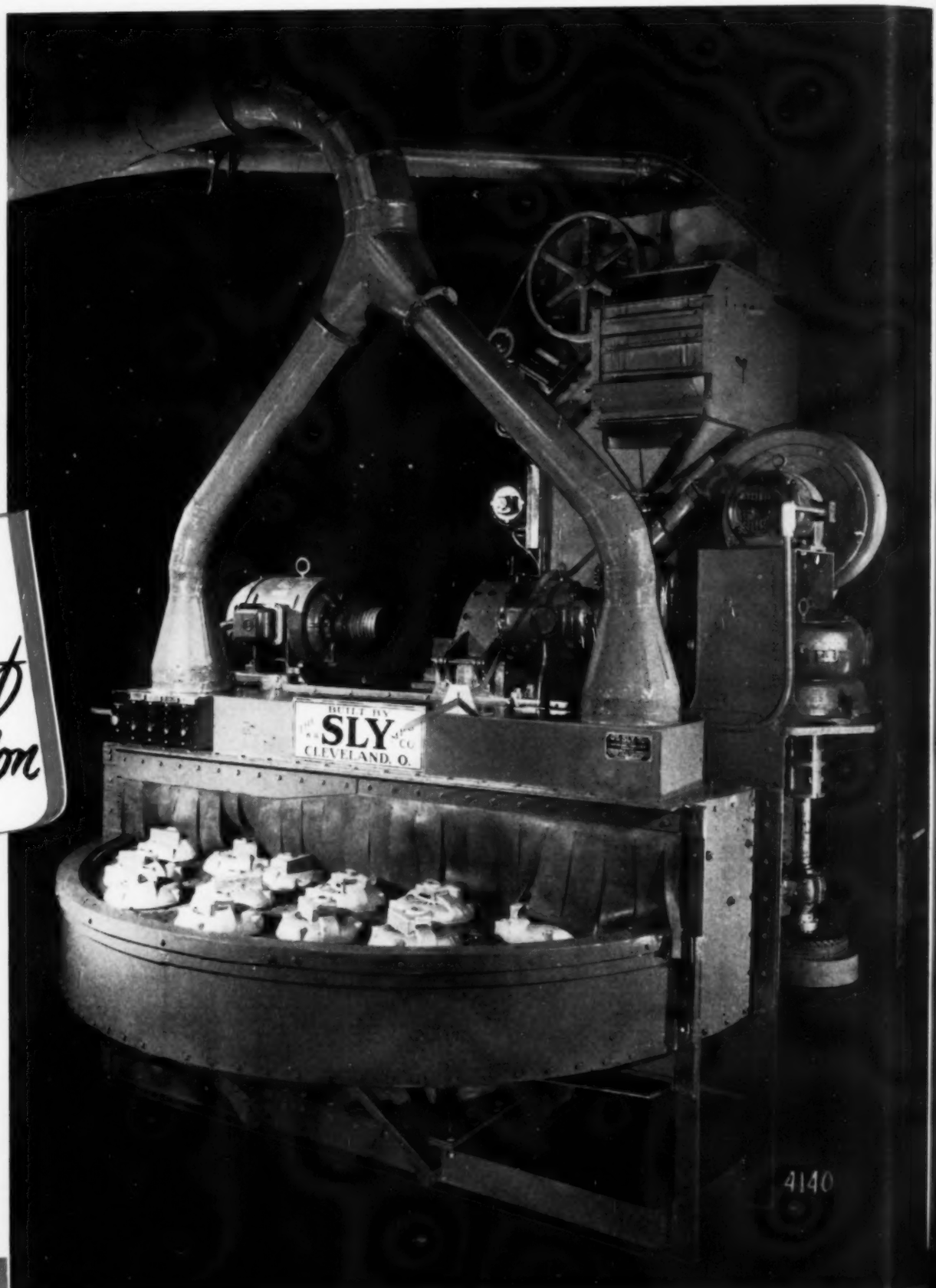
(*Continued on page* 202)

SLY Centri-Blast (AIRLESS)



In the Battle of Production

Sly is helping set new production records by providing, from the complete line, the right kind of foundry cleaning equipment for the particular type of work to be cleaned — by providing equipment of definitely greater cleaning efficiency, which cleans better, faster and at lower cost.



SLY AIRLESS BLAST CLEANING EQUIPMENT
MILLS AND TABLES

Exclusive wheel features for fast and economical cleaning. Typical of expressions from users is: "This machine is doing an economical job of cleaning our steel castings."

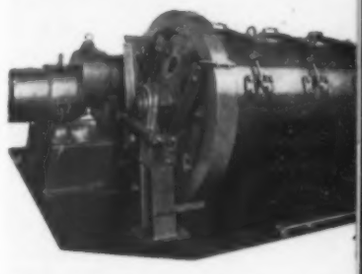
SLY CLEANS BETTER, FASTER AND AT *LOWER COST*

SLY BLAST ROOMS

Only Sly Blast Rooms offer you these exclusive features for better ventilation and more economical operation: (1) Overall down-draft ventilation. (2) Ample illumination. (3) Lined throughout with 3/16" wear plates. (4) Floor of grating and perforated plates.

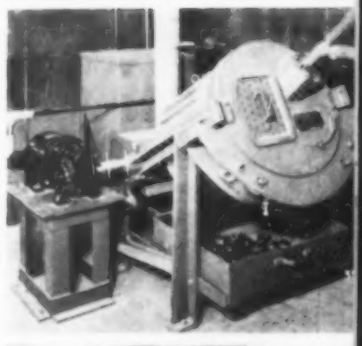
SLY TUMBLING MILLS

Pioneered by Sly 68 years ago; constantly improved. Built for tough use and fast cleaning: (1) Heavy forged steel trunnions, extra heavy roller bearings. (2) Special door locks—easily operated. (3) Extra heavy gearhead motor. (4) Integral motor platform. (5) Loading and unloading from either side.



SLY BLAST MILLS

Only Sly can give you the Tilted Blast Mill and its many advantages: (1) Handles quantities of castings, forgings, stampings, hardened steel parts. (2) Tilted barrel with rolling action. (3) Convex perforated bottom plate forms bottom of barrel. (4) Work is constantly turned, bringing bottom pieces to top. (5) Stationary head of barrel has large door for loading.



SLY BLAST CABINETS

This new model incorporates these important advantages: (1) Two lights mounted at front to illuminate castings. (2) Operator's eyes shielded by protective hood. (3) Easy loading and unloading of castings. (4) Used for thorough cleaning of small and intricate parts, or as an auxiliary to larger units.

SLY DUST FILTERS

Most economical in space and power with exclusive features: (1) More filter cloth—hence greater filtering capacity. (2) Filter bags under tension (patented) insure: (a) minimum resistance to air flow, and (b) complete dust removal. (3) Simpler shaker mechanism—less moving parts, less maintenance. (4) Bags more easily replaced. (5) Automatic control — any degree.

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68 YEARS OF SERVICE TO THE FOUNDRY INDUSTRY

Wisconsin HOLDS FIFTH REGIONAL

NOTWITHSTANDING the extreme activity of foundries in the Milwaukee area, the fourth regional foundry conference held by the Wisconsin Chapter of the A. F. A. had a registered attendance of 510, and approximately 700 were present at the dinner. The conference, comprising a two-day meeting on Feb. 26 and 27 at the Schroeder hotel, Milwaukee, was arranged by a committee under Chairman H. C. Waldron, Nordberg Mfg. Co., and Co-chairman Prof. J. F. Oesterle, University of Wisconsin, Madison, Wis., and was sponsored jointly by the University of Wisconsin and the Wisconsin Chapter.

In addition to 14 technical sessions, two luncheons and a dinner were held. Opening meeting was a luncheon held on Feb. 26 at which F. E. Johnson, dean of the college of engineering, University of Wisconsin, welcomed those attending the meeting. President Dykstra, University of Wisconsin spoke at the luncheon held Feb. 27 on the urgent need of continuing and even expanding higher education. While such training is important for supplying technical men during the war, it will be much more important after the war where broad views will be essential in recognizing and settling equitably problems of the existing world.

Brig. Gen. Henry J. Reilly, New York, presented a rather cheerless picture of the war effort of the United Nations against the enemy at the dinner held Thursday night, Feb. 26. He blamed the lack of preparedness in this country on the Washington arms conference in 1920 when the United States scrapped 13 capital ships and Japan only three. He also pointed out that many of the fortified areas over the world, such as Singapore, Corregidor, Hong Kong, etc., were built previous to the ascendancy of the airplane.

First technical session held at 2 p.m. Thursday, Feb. 26 was a joint meeting under the direction of A. M. Fischer, chairman. A. F. Pfeiffer, Allis-Chalmers Mfg. Co., was the speaker and he discussed "Pattern and Casting Relationships." He pointed out the need for close cooperation between designer and

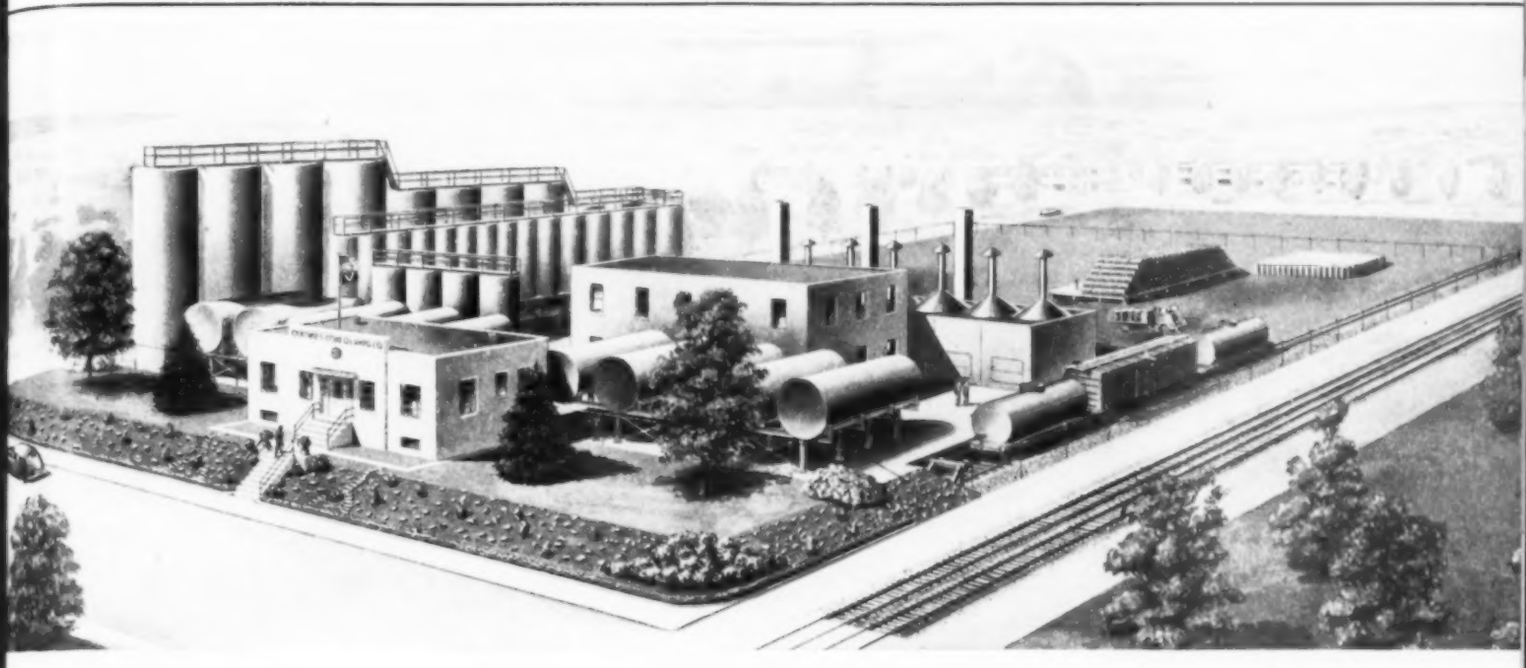
(*Continued on page* 162)

An excellent attendance marked the Wisconsin Regional Foundry Conference. Photos courtesy John Bing, A. P. Green Fire Brick Co., Milwaukee

The CORE OIL DOCTOR

Devoted to new ideas and case study reports on core room practice

Published Monthly, Volume 1, Number 1, April 1942



Pictured above is our newly completed and greatly enlarged plant at 3308-26 S. Cicero Ave., Cicero, Illinois. Planned with a view to better serving our many friends in the foundry field, equipped to render an even faster service than heretofore, it is the most modern and largest exclusive core oil plant in the world today, 350,000 gallons storage capacity; six large, high speed kettles; modern weighing, pumping and filling equipment and all under laboratory control. The "V" flag flies high on our masthead, just below Old Glory. We are prepared for any emergency. Let us solve your core oil problems for you.

Remember our Booth at the Cleveland Show? We'll be at **Booths 100 and 102** *at this year's Foundry Show. Bring your core oil problems in to talk over.*

Questions *and* Answers . . . .

Question: Do changes in temperature affect core oil or core mixes?

Answer: The average core oil will expand or contract 28½% of its volume with a temperature change of 100°. If oil is used *by measure* and its temperature in summer is 80° F. and in winter 20° F., the container holds 17% more oil in winter. This results in cores, made in the winter time, not being properly baked and more smoke and gas when the metal is being poured unless the heat or baking time is adjusted. Also, if the cores have sufficient strength with 17% less oil in the summer, this extra oil used in the winter is wasted and increases smoke and gas at the very time when foundry windows and doors are closed.

We will gladly explain this problem more fully upon receipt of written request.

Remedy: Do not use core oil by measure —weigh it! Save core oil—get better cores.

Have you a core room problem? Write us in strictest confidence; maybe we can help you.

Pictured below is our new, modernly equipped laboratory where all core oil processing is scientifically controlled. Incoming oil is sampled, analyzed and weighed; batches from each lot in process are tested; pilot cores are made and tested and new theories accepted or rejected on the basis of final result. Each formula is registered to insure uniformity of each succeeding lot made.

Making castings to fill the needs of the great war program now under way *cannot be guesswork!* Dependable core oil is needed to do this vast job right. Let us tell you about Certified Core Oil and how we effect economies for you on a predetermined laboratory basis.

A corner in our laboratory showing some of ou precision testing equipment where raw an finished oils are carefully analyzed and eac formula is registered to insure future batche of core oil "exact to specification."

CERTIFIED CORE OIL & MFG. CO.

"The House of Dependability"

3308-26 South Cicero Avenue, Cicero, Illinois

Stock and Representatives: Buffalo, N. Y. Elmira, N. Y. Worcester, Mass. Reading, Pa. Newark, N. J. St. Louis, Mo. New Orleans, La. Houston, Tex. Chattanooga, Tenn. Minneapolis, Minn.

REG U S PAT OFF

(*Continued from page* 160)
foundryman to produce a casting to meet requirements at the most economical cost. Mr. Pfeiffer advocated the use of scale models where possible since they have two applications, namely showing the designer where changes can be made to facilitate production, giving the foundryman a chance to study gating, risering and coring procedure.

Following the joint session the meeting broke up into four groups which discussed gray iron, malleable, steel and nonferrous problems.

The gray iron group under the direction of Lee E. Everett, Kaukauna Machine Corp., Kaukauna, Wis., heard H. C. Aufderhaar, Electro Metallurgical Co., Chicago, speak on "High Test and Alloy Castings." He stated that carbon control was important since carbon may have two to three times the effect of silicon, and the value of late silicon additions in the ladle was in providing better graphite structures. He discussed use of various alloying agents pointing out that silicon made carbon unstable while chromium was a stabilizer. Hence, one can be used to counteract the effect of the other to obtain desirable properties in the final iron. Molybdenum additions increase strength under practically all conditions while manganese is used in low and medium carbon irons to correct internal shrinkage. Combination alloys usually give better effects than a single one.

Malleable foundrymen with M. Harder, Lakeside Malleable Castings Co., Milwaukee, in the chair, held a core clinic at which William Buck-

(*Continued on page* 164)

Sixteen individual and two joint technical sessions were devoted to discussions of foundry subjects at the Wisconsin conference. Photos courtesy of John Bing, A. P. Green Fire Brick Co., Milwaukee

THERE'S MUCH OF INTEREST AT THE AJAX EXHIBIT!

1 INGOT METAL NONFERROUS . . .

CASTINGS IN THE WAR EFFORT

How Ajax nonferrous ingot metals of today enter into castings for the war and victory effort may be seen at the Ajax exhibit . . . together with specimens of the Ajax ingot metals and alloys from which the castings were made. Items of especial interest to all foundry personnel have been selected.

2 A NEW KIND OF EXHIBIT ON FOUNDRY PRACTICE

APPRENTICES & SUPERVISORS NOTE:

Interest today centers around the control of each step in casting so that defects may be evaluated and corrected unfailingly. To this high and worthy goal of foundrymen in the nonferrous field, Ajax contributes at this time "exhibit castings" in which difficulties were first isolated and then overcome, in line with expert practice and observations found in the Manual of The Nonferrous Ingot Metal Institute, Section 6.

3 AJAX TOMBASIL

THE ESTABLISHED SILICON BRONZE

A copper-silicon-zinc alloy of the useful and versatile 'Tombasil' family has been developed for the tinless trend in bronze. Known as Ajax 'Navy' Tombasil, it possesses physical properties far in excess of either Government G Bronze (88-10-2 . . . 88-8-4) Specification 46M6G; or "M" Metal Specification 46B8G; as well as the physical values stipulated in Navy Specification covering Copper-silicon Alloy known as Specification 46B28. See and discuss castings made from it.

4 MELTING INDUCTION FURNACES

FERROUS & NONFERROUS

The widely used high-frequency (Ajax-Northrup) and low-frequency (Ajax-Wyatt) electric melting furnaces have revolutionized melting practice in the ferrous and nonferrous fields. Each operates on a unique induction principle which is graphically illustrated at the Ajax Booth. Those interested in melting high-grade steel alloys and the nonferrous metals should study these furnaces.

5 ALUMINUM MELTING FURNACES

Aluminum and aluminum alloys can now be melted on a full production scale in low-frequency induction furnaces of the famous Ajax type. Known as the Ajax-Tama-Wyatt, the furnace for aluminum has efficiencies between 77 and 80%, melting 5 lbs. per KWH, with all the inherent advantages of the pioneer Ajax induction melting principle which gives such matchless performance in the brass mills today.

6 HEAT-TREATING

INDUCTION & ELECTRIC SALT BATH FURNACES

Induction heating by means of Ajax-Northrup furnaces, together with immersion heat treatment by means of the Ajax-Hultgren electric salt bath furnaces are the outstanding developments of recent years. Investigate applications (Ajax-Northrup) to hot forming, forging, brazing, for example; and salt bath furnaces (Ajax-Hultgren) for carburizing, simultaneous brazing & carburizing; neutral, cyanide, and age hardening; tempering, selective heating, hardening moly high speed steel tools.

TO YOUR RIGHT, **MAIN EXHIBITION HALL ENTRANCE — BOOTH 90-96**

THE AJAX METAL COMPANY
PHILADELPHIA
ESTABLISHED 1880

ASSOCIATE COMPANIES:

AJAX ELECTRIC FURNACE CORPORATION, *Ajax-Wyatt Induction Furnaces for Melting*
AJAX ELECTROTHERMIC CORPORATION, *Ajax-Northrup Induction Furnaces for Melting, Heating*
AJAX ELECTRIC COMPANY, INC., *Electric Salt Bath Furnaces*
AJAX ENGINEERING CORPORATION, *Ajax-Tama-Wyatt Aluminum Melting Furnaces*

(*Continued from page* 162)
holtz, Belle City Malleable Iron Co., Racine, Wis., as the principal speaker. Mr. Buckholtz stated that his firm is having good success with infra-red rays for core drying. One hundred lights with 10 and 12-inch reflectors are used for certain work. Drying action penetrates deeply, and heat from the lamps reaches a temperature of 370 degrees Fahr. A fast drying oil is used for bonding the cores.

W. F. McKee, Key Co., East St. Louis, Ill., was chairman of the steel session at which G. V. Anderson, Bucyrus-Erie Co., Milwaukee, and L. E. Everett discussed "Steel Casting Design in Relation to Quality and Cost." Mr. Anderson said that to obtain the best results co-operation between designer and foundryman was essential since one could learn from the other why and how certain conditions must be met. Thorough discussion of design and molding necessary procedure usually brought about changes which gave the best casting at the lowest cost. Mr. Anderson also pointed out the value of scale models in such discussions to both designer and foundryman. Lee Everett stated that from the standpoint of design, the quality of a steel casting must have the proper physical properties, be of the correct composition, true to size and shape, of satisfactory appearance, and represent minimum cost for duty required. Often due to excess safety factor, weight is greater than necessary. Also imposition of unnecessary restrictive specifications add to foundry hardship and cost. However, where service requirements are severe, such restrictive specifications are needed.

Printed Forms Available

Nonferrous foundrymen listened to a talk by Frank Tharinger, Priorities division, WPB, Milwaukee, on priorities and allocations. A. K. Higgins, Allis-Chalmers Mfg. Co., Milwaukee, was chairman. Mr. Tharinger stated that printed forms were available for obtaining most of the materials used in castings production, and in such cases where materials were not covered, priority officials would be glad to discuss the problem and try to obtain information.

On Friday morning Feb. 27 eight technical sessions were held. Four simultaneous meetings began at 9 a.m. and four at 10:30 a.m., and were devoted to the four branches of the industry. Lee Everett was chairman of the 9 o'clock session on gray iron at which N. J. Dunbeck, Eastern Clay Products Co., Eifort, O., spoke on "How To Change Properties of Sands." Mr. Dunbeck said that while synthetic sand is flexible and can be used satisfactorily for a wide variety of work, it usually is good economy to change the properties of the sand in accordance with the work, particularly if defects are believed due to sand. He discussed various properties such as green strength, mixing, moisture, ramming, fines, bond, etc., and how they can be changed to meet requirements. The concluding part of his talk was devoted to causes of sand defects and the remedies to be applied.

Second technical session on gray iron was under the direction of A. Haack. Subject for discussion was "Casting Defects," and W. A. Hambley, Allis-Chalmers Mfg. Co., Milwaukee, was the leader. Mr. Hambley listed 36 casting defects which had been accepted by the A. F. A. committee on analysis of casting defects, and the various operations which contributed to the causes of the defects. As each type of defect was described the causes and remedies were outlined.

Malleable Casting Design

The two morning sessions on malleable cast iron were on casting design and pearlitic malleable iron. First session was under the direction of E. B. Hansen, Wisconsin Appleton Co., South Milwaukee, Wis., and J. H. Lansing, Malleable Founders' Society, Cleveland, was the speaker. He discussed "Casting Design" with specific reference to malleable cast iron. According to Mr. Lansing there are 17 basic recommendations which should be followed to obtain the most satisfactory results, and the first is co-operation of designer with the foundryman. Others include uniformity of section, locations of heavy sections, ribs, etc. so that they may be fed properly, large fillets, avoidance of deep pockets and small recesses, proper pattern draft, even parting lines, etc.

Carl Joseph, Saginaw Malleable Iron division, General Motors Corp., Saginaw, Mich., was the speaker at the second morning session on malleable iron. E. P. Meyer, Chain Belt Co., West Allis, Wis., was chairman. Mr. Joseph discussed pearlitic malleable cast iron, which he stated resembles spherodized steel in structure. His firm calls the material "ArmaSteel," and the product sometimes is referred to as graphitic steel. The material is being used both in automotive and ordnance applications, and numerous comparisons were made between the product and similar pieces made of steel, gray iron, and aluminum in the rough and finished states.

Two sessions on steel were under the direction of Chairman H. Hoffman and John Wettergreen respectively. At the first session Raymond Bloom, Ladish Drop Forge Co., Milwaukee, discussed "Magnaflux Testing" while E. J. Wellauer, Falk Corp., Milwaukee, described the use of gamma and X-rays. Both types of tests were employed for nondestructive examination of castings. At the second steel session Harry W. Dietert, Harry W. Dietert Co., Detroit, spoke on the "Behavior of Steel Facing Sands, and Core and Mold Washes at Elevated Temperatures."

At the first of two sessions on nonferrous founding Henry Hagemeyer, Castings Patent Corp., Chicago, described some features of a proprietary plaster molding process. J. C. Stern, Ampco Metals Inc., Milwaukee, presided. Mr. Hagemeyer stated that the process was limited to metals and alloys whose pouring temperature was not over 2300 degrees Fahr. Best results are obtained with special gating which permits directional solidification of the metal. In producing brass castings where the process is finding considerable application 0.10 per cent aluminum, silicon or beryllium is added to the alloy. Lead over 2¼ to 2½ per cent results in segregation and dirty castings. Recent experiments indicate that with a properly designed feeder system, pressure tight castings could be obtained by plaster casting.

Centrifugal Casting

Harold B. Zuehlke, Allis-Chalmers Mfg. Co., Milwaukee, presented an interesting discussion on "Centrifugal Castings" at the second morning session which was under the direction of Walter Edens, Ampco Metals Inc. He pointed out that the process is not new, and that the casting machines rotate the molds on a horizontal axis, a vertical axis or on an axis between the two. Where length of the casting is equal to or less than the diameter it may be produced on a vertical axis, but as length increases the axis proceeds to horizontal. Mr. Zuehlke described numerous features in connection with centrifugal casting, pointing out that to obtain good castings it is necessary to distribute the molten metal uniformly and quickly over the entire mold surface, secure progressive solidification of the metal, and accumulate all dirt and impurities in the bore where they may be removed by machining.

Concluding sessions of the conference were held Friday afternoon, Feb. 27 at 1:45 p.m. In a session devoted to gray iron under Chairman A. Haack, melting practices was the topic of discussion with John Lowe, Battelle Memorial In-

(*Concluded on page* 199)

ANSWER AMERICA'S CALL FOR GREATER, FASTER PRODUCTION

GET CLEANER, SOUNDER CASTINGS WITH H & H MOLDING SANDS

. . . .—America must have more tanks—more ships—more fighting planes—now! These will require millions of foundry castings!

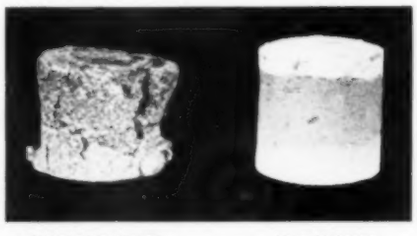
. . . .—*The quality and quantity of castings and the speed at which you produce* can determine how soon America's war needs will be supplied. *The molding sand you use* will largely be a determining factor in your production rate and the quality of your castings!

. . . .—Don't take chances! Use H & H Molding Sands! Get smoother, sounder castings with less waste—less scrap!

. . . .—H & H Molding sands are laboratory-controlled to specified permeability, bond-content and strength. H & H Molding Sands are produced in more than 100 grades from 5 to 1200 permeability with optional clay content and strength. You may have any sand your job requires.

. . . .—Don't wait! Write us today regarding your individual requirements or ask a representative to call.

THIS SIMPLE TEST PROVES H & H DURABILITY!



ORDINARY SAND — H & H SAND

Here's what happened when these two samples were subjected to 2500° F. for seven minutes. H & H holds up. Ordinary sand breaks down. The heat resisting bond in our sands makes the difference. Many of our deposits have the highest sintering point of any natural sand in America.

WE'LL SEE YOU AT THE CONVENTION—BOOTH 215

PROMPT DELIVERY

TO HELP YOU MEET YOUR PRODUCTION SCHEDULE
EVERY CAR LABORATORY-TESTED BEFORE SHIPPING

QUALITY SANDS SINCE 1910

HOUGLAND & HARDY, Inc. (H) **HARDY SAND COMPANY**

PRODUCING THE WORLD'S LARGEST VARIETY OF MOLDING SANDS

EVANSVILLE, INDIANA

activities of foundry groups

S. California

PRESIDENT'S Night for the Southern California Chapter of the A.F.A. was held at the Clark Hotel, Los Angeles, Feb. 17. There were 100 members present to greet the National President of the A.F.A., Herbert S. Simpson, and to enjoy one of the most interesting meetings of the year.

Meeting was called to order by President B. George Emmett, Los Angeles Steel Casting Co., Los Angeles. Report of the membership committee was made by George Effinger, who also introduced those members whose applications were received during the month. Report from the program committee was made by Earl Anderson, Enterprise Iron Works, Los Angeles, who is the chapter's vice president.

President Simpson was introduced and gave a very interesting talk, reporting on the 1942 convention to be held in Cleveland in April, and urging as many as possible to attend. He explained the government would have a large exhibit displaying materials needed in the defense program and that such an exhibit would be of vital interest to everyone in the foundry industry.

M. F. Pendergast, Whiting Corp., gave a most interesting paper which outlined the history of the cupola since the year 1840. A discussion followed the presentation of the paper which certainly was of importance to the gray iron industry.

Prior to the regular meeting, President Simpson addressed a special board of directors meeting, stressing the membership drive and other vital matters pertaining to A.F.A. work.—*W. D. Bailey Jr., secretary.*

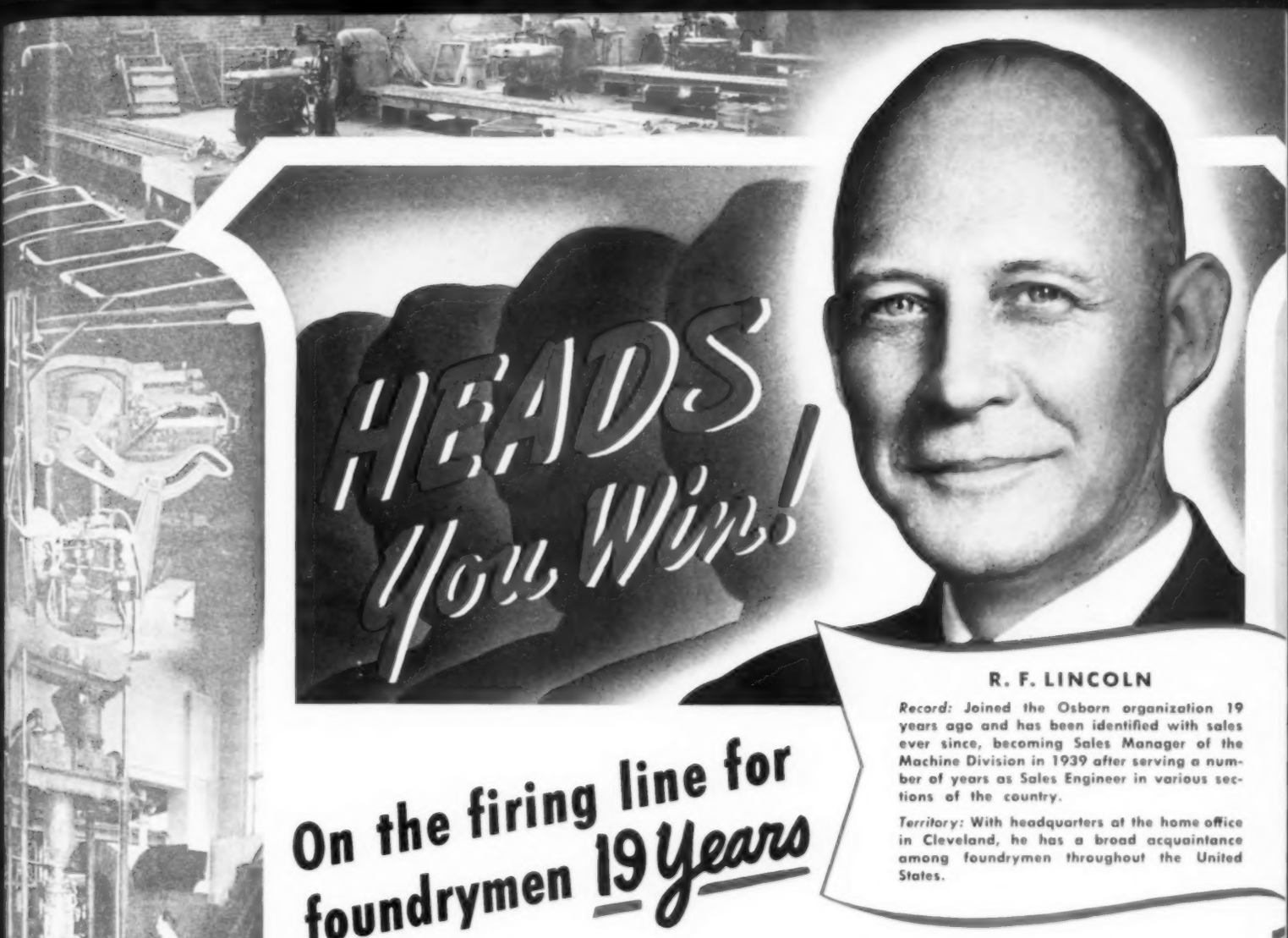
Chesapeake

AFTER several attempts, the Chesapeake Chapter of the A.F.A. finally succeeded in having the dean of foundrymen, Pat Dwyer, engineering editor of THE FOUNDRY to talk to the group on his favorite subject, namely, "Gates and Risers." The same evening Mr. Dwyer spoke, Baltimore experienced its first blackout rehearsal, but Mr. Dwyer talked right on through the blackout and back to light again. The meeting was held at the Engineers Club on Friday, Feb. 27, with 75 people present. Mr. Dwyer's lecture and illustrated slides proved to be very interesting and instructive.

In response to the announcement of Chapter Chairman, Edwin W. Horlebein, Gibson & Kirk Co., Baltimore, and through the efforts of John A. Heard, pattern shop foreman of the Crown Cork & Seal Co., Edward Cosica and Jerome Petr, patternmaker apprentices of the same company, submitted patterns to be entered in the 1942 national apprentice contest. The patterns the two boys made were examples of fine workmanship. Walter Moviltz, foreman, pattern shop, the Gibson & Kirk company, and John Greenstreet, manager, Maryland Carwheel Co., spent several hours checking them and finally decided that the pattern made by Jerome Petr had won by a small margin over the pattern submitted by Edward Cosica. As a reward, each of the boys was presented with a junior membership in the Chesapeake Chapter.

(*Continued on page* 169)

Upper left, (left to right) Earl L. Ranker; H. S. Alurne, L. J. Iabarola, M. S. Nauss, all of York Ice Machine Co., York, Pa.; H. G. Stults, George F. Pettinos Co.; and H. P. Good, Textile Machine works, Reading, Pa. Upper center, (left to right) Edward Cosica and Jerome Petr, pattern apprentices who submitted patterns to the national contest. Upper right, (left to right) John Greenstreet, Maryland Carwheel Co., and Walter Moviltz, Gibson & Kirk Co., checking pattern entries. Lower left, head table. Lower center, L. H. Denton, chapter secretary. Lower right, (left to right) Frederick Bruggman, Gibson & Kirk Co., Pat Dwyer, and Chapter Chairman, Edwin W. Horlebein, Gibson & Kirk Co. Photos courtesy of Frederick Bruggman, Gibson & Kirk Co., Baltimore



R. F. LINCOLN

Record: Joined the Osborn organization 19 years ago and has been identified with sales ever since, becoming Sales Manager of the Machine Division in 1939 after serving a number of years as Sales Engineer in various sections of the country.

Territory: With headquarters at the home office in Cleveland, he has a broad acquaintance among foundrymen throughout the United States.

On the firing line for foundrymen 19 Years

Ever since he joined Osborn in 1923, Russ Lincoln, like the rest of the Osborn organization, has endeavored to be of continuing and increasing service to the foundry industry.

That same aim shapes and guides his work today. As Sales Manager of the Machine Division, it is his responsibility to see that Osborn gives the greatest possible service to the men, plants and machines the nation is depending upon for castings for the tools and weapons of war.

In both policy and practice Osborn and all its men will continue on that course until Victory—and beyond.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★

Attend the 46th Annual Convention A. F. A. Cleveland, April 20-24

Because every available unit is at work helping to produce the things America needs, Osborn will be unable to display Moulding and Core Blowing Machines at the Foundry and Allied Industries Show. But Osborn representatives will be present to renew personal contact with the foundrymen who are doing so much today for our country. You'll find us in Spaces No. 350 and 352.

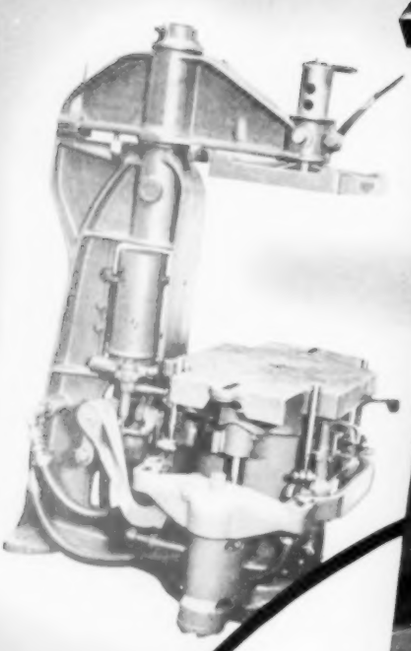
★ ★ ★ ★ ★ ★ ★ ★ ★ ★

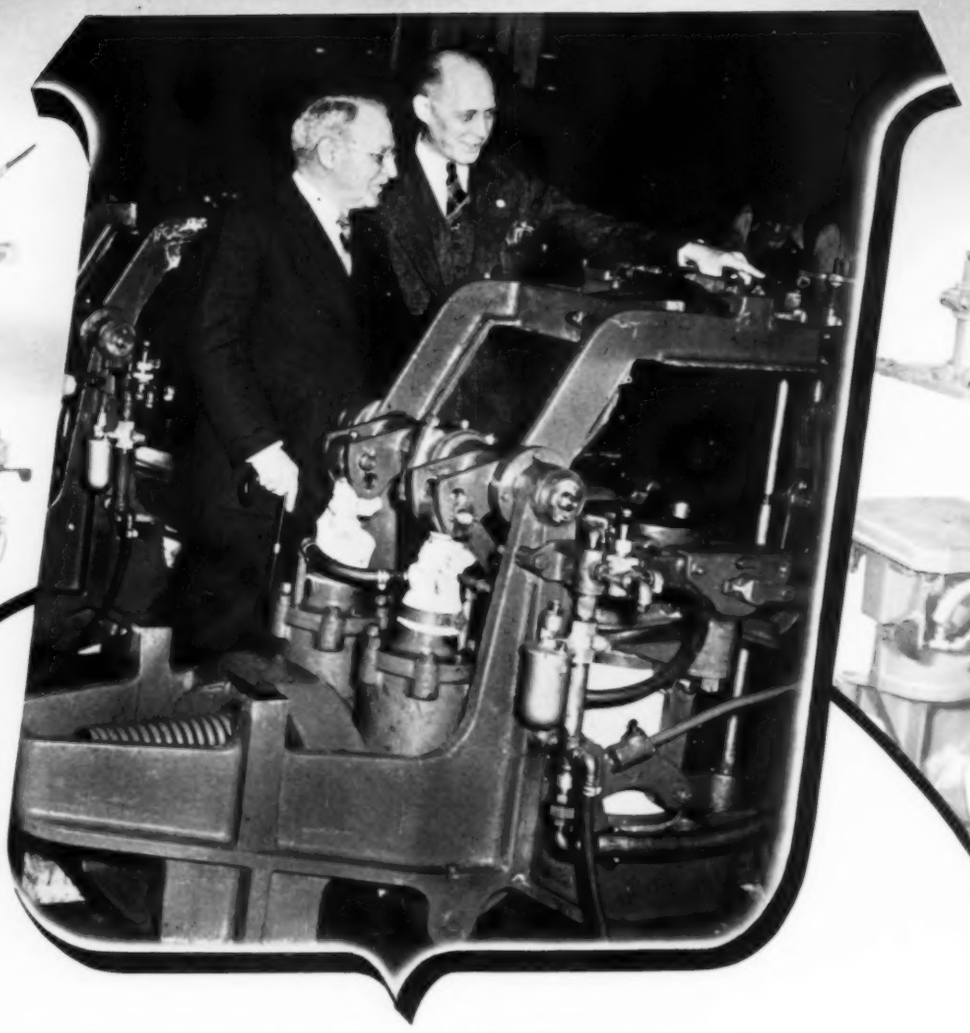
THE OSBORN MANUFACTURING COMPANY

5401 Hamilton Avenue • Cleveland, Ohio

OSBORN

MOULDING MACHINES





Franklin G. Smith, President of Osborn Manufacturing Company for 50 years, and Sales Manager R. F. Lincoln inspect one of a group of precision-built machines for producing Pratt & Whitney aircraft engine cylinder head moulds.

We're with you in this war —up to final Victory

Osborn Moulding Machines of every type today are engaged in capacity production of moulds for making the countless cast parts in equipment our army and navy and air force must have, and have quickly.

The ability of Osborn machines to produce more moulds, better moulds, and produce them with economy and speed, is, we believe, both a highly important contribution to the war effort and a tribute to the men and plants who use them.

THE OSBORN MANUFACTURING COMPANY

5401 Hamilton Avenue • Cleveland, Ohio

OSBORN

MOULDING MACHINES

(*Continued from page* 166)

David Tamor, metallurgist, American Chain & Cable Co., York, Pa., has been appointed technical secretary. Mr. Tamor will make notes of all the important facts and details given to the chapter by the different speakers. That information then will be printed and forwarded to the members for permanent record. A folder for filing the information will be mailed to all members in the near future.—*Frederick Bruggman.*

Western N.Y.

WESTERN New York Chapter's meeting of March 6 followed the worst snowstorm the district has had in 6 years. One might have thought the chapter was planning to entertain the Hardy family instead of guests from milder climes. However, the hardy members of the chapter turned out, and there was really a splendid attendance under the circumstances. To be consistent and to keep everyone's mind off the snow shovels, there was a presentation of the American League's 1942 movie "The Ninth Inning" which showed all the stars of the diamond. Following the movie Bruce Artz and A. L. Gardner of Pangborn Corp., Hagerstown, Md., gave excellent talks on blast cleaning equipment with most interesting pictures of outstanding foundry operations.—*Eliot Armstrong, secretary.*

Connecticut

TWO hundred forty-seventh meeting of the Connecticut Foundrymen's Association was held at the Quinnipiack Club, New Haven, Conn., on Feb. 27. George R. Holmes, McLagon Foundry Co., New Haven, and treasurer of the association, introduced the speaker of the evening, John Sweeney, of the Florence Pipe Foundry & Machine Co., Florence, N. J., Mr. Sweeney presented a very thorough and interesting talk in regard to "Housekeeping in the Foundry" explaining that with proper housekeeping, accidents and loss of time in the foundry can be reduced materially. A lively discussion followed his talk and as the speaker explained his subject more thoroughly under questioning, many interesting points were brought out. Mr. Sweeney prefaced his talk by explaining that he had served his apprenticeship as a machinist and foundryman, and had played professional baseball in New Haven some years ago. Therefore, he felt that with his background, he knew most of the answers, and it was proved that he certainly did.

The meeting was adjourned after a rising vote of thanks to Mr. Sweeney.—*Henry C. Griggs, secretary.*

Wisconsin

ANOTHER successful group session marked the Jan. 16 meeting of the Wisconsin Chapter of the A.F.A., at which 225 foundrymen were first treated to a showing of a motion picture entitled, "Unfinished Rainbows" presented through the courtesy of the Aluminum Co. of America. Chairman Howard Waldron of the conference committee explained the program arrangements. The foundry conference, according to all reports is shaping up as one of the most successful yet to be held. The meeting then divided into various groups which are as follows:

Frank Kulka, general superintendent, Motor Castings Co., and chairman of the gray iron group, introduced F. A. Pample, Chain Belt Co., who gave an interesting talk on "Cost of Material Handling and Good Housekeeping", with Harry Ladwig, Allis-Chalmers Mfg. Co., as discussion leader. There was considerable discussion on the feasibility of sand handling equipment for small two or four-man machine units; also relative to cost, desirability and flexibility of sand handling equipment for large units. Discussions developed on number of tons of material handled per ton of castings shipped, and cost per man on sand unit installation that was profitable. General opinion was that a majority of improvements made in foundry practice involved mechanical handling of material or metal, although through close observation, many important savings can be made through good housekeeping, developing a definite sequence of operations, eliminating loss of time through proper layout of flasks and sand piles on floors with reference to molding machines.

E. C. Zirzow, sand control man with the National Malleable & Steel Casting Co., spoke to the malleable group on the subject of the "Practicability and Cost of Natural Bonded Sand vs. Synthetic Sand." W. B. Hansen, Wisconsin Appleton Co., was chairman of the meeting.

The nonferrous group discussed "Patterns for the Jobbing Foundry" under the chairmanship of L. J. Andres of the Gerlinger Brass & Aluminum Co. Alfred M. Fischer, Charles Jurack Co., was the speaker and discussion leader. The chapter was privileged to have the actual patterns produced in the national 1941 patternmaker apprentice contest. Following a few preliminary remarks by Mr. Fischer, the evening was devoted largely to discussing the various apprentice patterns with respect to methods of molding and gating, translating many of the comments into work now in the various members' shops. After considerable bantering between patternmakers and foundrymen in attendance, it was agreed unanimously that more effort should be put into working with the designing engineer toward the ultimate goal of designing more castable castings which would result in better castings at lower cost.

The steel division with Fed Pritzlaff, foundry superintendent, Falk Corp., as chairman, devoted its meeting to a discussion of core and molding sands. Paul Powers, Maynard Steel Casting Co., led the discussion on core sands, giving a summary of the core sand practice at his plant. Of the many phases of core sand practice discussed, the following seemed to create the most lively discussion: Use of iron oxide to prevent finning; use of both bentonite and oil in the same mixture; use of cereal binders and the temperature at which they lose their strength; burning in; relative merits of a silica flour sand and a fine sand. The molding sand discussion was led by Charles Fuerst, Falk Corp. Among the topics which Mr. Fuerst discussed were the following: Advantages and disadvantages of crude and washed and dried sand; fine versus coarse sand; extent to which old sand can be used as a facing sand; characteristic of the various binders; importance of milling practice. All of the topics brought considerable discussion from the floor.—*George K. Dreher, secretary.*

Twin City

MARCH meeting of the Twin City Chapter of the A. F. A. was held Monday, March 16, at the St. Anthony Commercial Club, Minneapolis. Dinner was served to 51 members and guests.

Following the dinner a brief business session was held and the officers for the ensuing year were elected as follows: Chairman, R. M. Aker, Western Alloyed Steel Casting Co., Minneapolis; vice chairman, R. W. Bingham, American Hoist & Derrick Co., St. Paul; secretary-treasurer, O. W. Potter, University of Minnesota, Minneapolis. Directors elected for a 3-year term: R. C. Wood, Minneapolis Electric Steel Castings Co., Minneapolis; R. W. Jones Jr., St. Paul Foundry Co., St. Paul; J. F. Staver, Staver Foundry Co., Virginia, Minn.; 2-year term, A. H. Trapp, Minneapolis-Moline

Power Implement Co., Minneapolis; I. F. Cheney, Griffin Wheel Co., St. Paul; E. C. Madson, Anderson Foundry Co., Bayport, Minn.; 1-year term, E. R. Frost, E. R. Frost Co., Minneapolis; Fulton Holtby, University of Minnesota, Minneapolis; Stuart Cameron Jr., Valley Iron Works Inc., St. Paul.

Program for the evening consisted of the motion picture, "Behind the Firing Line," shown by O. H. Read, A. P. Green Fire Brick Co., Mexico, Mo., and a talk by Milton H. Berns, Electro Refractories & Alloys Corp., Buffalo, on the subject, "The Manufacture and Care of Crucibles." The program was both entertaining and instructive and received high applause from those in attendance.—*O. W. Potter, secretary-treasurer.*

Pittsburgh

ANNUAL nonferrous meeting of the Pittsburgh Foundrymen's association was held Monday evening, Feb. 16, at the Roosevelt hotel, Pittsburgh. The new sound and technicolor movie, "Unfinished Rainbows", prepared by the Aluminum Co. of America, was shown, describing the development of aluminum, its historical background, and some of its war-time uses.

Silicon bronzes were discussed by the speaker of the evening, R. J. Keeley, Ajax Metal Co., Philadelphia. Mr. Keeley stressed use of silicon bronzes as a suitable substitute for tin bronzes during the present emergency where shortage of tin has caused foundries to search for substitute materials. Sample castings of various types were displayed by the speaker, including several typical applications, as well as a number of test bars showing the methods used in gating and risering for best results in avoiding leaks from pin holes and similar defects. Research conducted on silicon bronzes indicates that the navy bronze requirements can be met by an alloy of 5 per cent zinc, 5 per cent silicon and 90 per cent copper. In commercial applications the zinc content normally runs higher, about 14 to 15 per cent, with the silicon remaining about 5 per cent, and the balance copper. Better machining qualities are obtainable if a small percentage of lead is added, the quantity of lead being held low enough so it does not materially affect other physical properties of the alloy. In the display of castings were both sound and defective examples, and in each case Mr. Keeley pointed out why the defects occurred and how they can be avoided. Proper gating practice, in general, is the answer to most of these difficulties. Pouring temperatures on most of these silicon bronzes run lower than other alloys, the most generally accepted figure being about 1900 degrees. The results of pouring at 2200 degrees were shown in a spray of defective castings, while similar castings poured at lower temperatures came out free from all defects.

In the active discussion which followed the presentation of this paper, Mr. Keeley pointed out that because of limited use of silicon bronzes in many applications, the facts concerning their behavior in these uses are necessarily limited. Silicon bronzes are not being recommended for use in bearing work, although some bearings have been made of them and have proven satisfactory for light loads and with plenty of lubrication. These alloys have been successfully used under high pressure and high temperature conditions with good results.

The April meeting will feature a paper on steel casting practice by Dr. C. H. Lorig, Battelle Memorial Institute, Columbus, O.—*R. L. Hartford.*

Nor. Iowa

THE Northern Iowa Foundrymen's Association was host to the Waterloo Technical Society on Jan. 23. Dean M. D. Hesler of Iowa State College, Ames, Iowa, talked to 110 members of the two organizations on "The Engineer of Today."

In his talk Dean Hesler pointed out what industry is looking for, today, in an engineer, what the modern engineer is seeking when he looks for employment, and what Iowa State College is doing to train engineers to fit readily into modern industry. In Dean Hesler's opinion, the modern high school graduate is practically the equivalent of the college graduate of 25 years ago, thus giving the present engineering schools better raw material. With this foundation, the school is better able to give students the broad basis in science which is so much in demand by companies hiring men. This scheme of training produces ready adaptability of the engineer to any of a number of different types of jobs. In this connection, the speaker mentioned that there were more than 27,000 different kinds of employment open today.

Dean Hesler listed the following as the basis upon which the engineer judges a new job: Is the job permanent; what is the standing of the company; does company deal in or process necessities or are its products less staple; salary; is work honorable; is the company in a good location; and can he do any good in the company. The following were listed by Dean Hesler as being the factors by which the hiring companies judge applicants for engineering jobs: Is man healthy; is man loyal; is man honest and dependable; can man get along well with others; can man get along in the community; does man have a pleasing personality; is man alert; can the man express himself; can the man handle his own finances; and does the man appreciate beauty in any thing.

Dean Hesler's 25 years with Iowa State College provided an ample background for his talk which was of timely interest to everyone present at the meeting.

Fifty-five members and guests of the Northern Iowa Foundrymen's Association attended the regular meeting which was held in Black's Tea Room, Waterloo, Iowa, March 3. The following new members were taken into the association at that meeting. M. H. Lorenzen, R. W. Lorenzen, George Fergemann, and Joe Jurgens, all of Hawkeye Steel Products Co., Waterloo; Roy Furry, Peter Humont, D. O. King, Lyle Backins, and Paul Harland, all of Harmon Foundry, Waterloo; Arnold Luce, Robert Gittins, and W. R. Brewer, John Deere Tractor Co., Waterloo; and Forrest Allen, of the faculty of Iowa State College, Ames, Iowa.

A sound film was shown through the courtesy of the Carborundum Co., Niagara Falls, N. Y. During the discussion which followed the showing of the film L. W. Judy and S. F. Virtue of the Carborundum Co., answered various questions concerning use of abrasives and abrasive products in the foundry.—*F. R. Snyder, secretary.*

New England

GENERAL topic of the regular meeting of the New England Foundryman's Association held Feb. 11 at the Engineers Club, Boston, was "How Much Do You Know About the Foundry?", the program taking the form of a quiz. R. F. Harrington as chairman of one team opposed a second team captained by Raymond Meader, president of the association. There were 75 members and guests present.

"Dr." Walter M. Saunders Jr. asked the questions, alternating between the two teams. The questions varied considerably from grinding wheels to cupola operation. Each question furnished an individual topic for discussion, and toward the end of the evening, almost everyone had something to say, and "Dr." Saunders was called upon to act the part of King Solomon in deciding which of two answers was more nearly correct on several occasions. Defense stamps were given for correct answers, and the score of each

(*Continued on page* 173)

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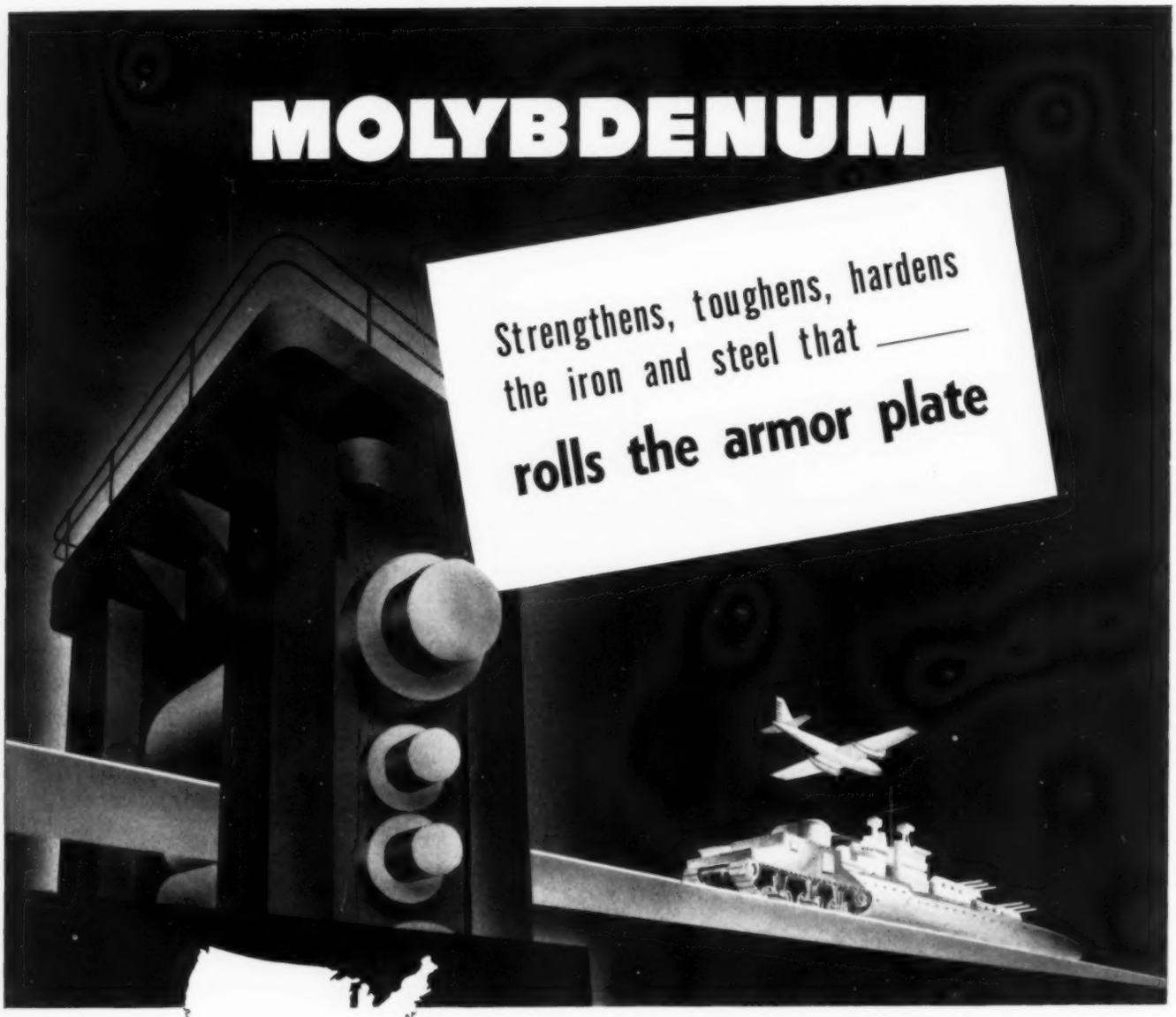

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(*Continued from page* 170)
team was also carefully kept by A. W. Calder.

At the conclusion of the quiz, a jackpot question was asked. Each person present was to write on paper as many types of casting defects as he could in a given time. It was explained that the list of 36 casting defects given in the November, 1941 issue of the *American Foundryman* would be used in judging the winner. All members obtaining 20 or more types of defects, submitted their papers to the judges and the winner and prize will be announced at next month's meeting. The judges of the evening announced that Mr. Harrington's team had won the evening's contest, and it was voted unanimously to turn the prize money over to the Red Cross.

This meeting was an innovation for the New England Foundrymen's Association, and proved unquestionably to be one of the most exciting and interesting meetings the association has had. Much credit is due Mr. Saunders and Mr. Calder for their work and ingenuity in making the arrangements.

Regular monthly meeting of the New England Foundrymen's Association was held at the Engineers Club, Boston, on March 11, with about 85 members and guests present.

After dinner, Chairman Raymond Meader, Whitin Machine Co., introduced A. B. Root, Hunt-Spiller Mfg. Corp., who presented a brief report of the plan sponsored by the Gray Iron Founders' Society for the organization of district committees to represent the gray iron jobbing foundries. The chairman of the 19 districts throughout the United States will constitute an advisory industry committee to confer with the Price Adminstrator, Leon Henderson, with respect to matters pertaining to price control of gray iron jobbing foundry castings.

The speaker of the evening was Gregory J. Comstock, professor, Stevens Institute of Technology, Hoboken, N. J., who spoke on "Powder Metallurgy." The powders generally are fine enough to put through a 100-mesh screen. Marked recent improvements were described in the process which essentially consist of forcing the material into metal molds or dies under pressure and subsequent heating at a temperature somewhat under the fusion point of the metal itself. That heating or sintering, as it is called, may take place at the same time that the metal is being pressed into the molds. Approximately 7000 to 8000 tons of powdered metals were processed last year. Small bearings, bushings, tungsten lamp filaments and brake drums are typical examples of parts now being made.

Professor Comstock showed some interesting slides of the microstructure of the processed metals. Considerable interest was shown by those present and a lengthy discussion period followed the address.

The speaker for the next meeting, to be held April 8, will be Ralph A. Meigs, Liberty Mutual Insurance Co., who will talk on "Accident Prevention."—*M. A. Hosmer.*

N. California

FOR the past several years the Northern California Chapter of the A.F.A. has co-operated with the California State Chamber of Commerce by holding an afternoon session for foundrymen in conjunction with the Iron, Steel and Allied Industries conference at Del Monte, Calif. This year marked the eighteenth annual meeting, convening on Feb. 12 and closing Feb. 14.

The foundry meeting was held Thursday afternoon under the chairmanship of Robert Gregg, Reliance Regulator Corp., Alhambra, Calif., and was addressed by Herbert S. Simpson, president of National Engineering Co., and president of the American Foundrymen's Association. His subject was, "Modern Methods in Foundry Production." J. A. Gitzen, president, Delta Oil Products Co., Chicago, spoke on, "Core Binders and Their Application in Core Sand Mixtures." "X-Ray and Gamma Ray of Steel Castings," was covered by Lieut. Commander R. K. Hodgson, U. S. Navy. "Iron and Steel Scrap Situation" was discussed by Rosewell Whitman, Office of Price Administration, Washington. Each of the several subjects presented were gone over by informal discussion from the floor.

Fifty-two men attended the foundrymen's conference with representation about equal for the northern and southern sections of the state. There was also a general session held on Friday morning at which time Herbert S. Simpson was a principal speaker, and his topic, "Castings in Industry."—*George L. Kennard, secretary-treasurer.*

New Jersey

SPEAKING on the subject "A Machine Tool Foundry," James D. Coltman, foundry superintendent, Bullard Co., Bridgeport, Conn., described practice in various departments of his foundry to members of the New Jersey Foundrymen's Association, at the Downtown Club, Newark, N. J., Wednesday, Feb. 25. The meeting was the second of the association's forty-second year, and was well attended.

Mr. Coltman, who appeared before the members four years ago, stated that war work had greatly expanded machine tool foundry operation, and he dwelt particularly on new methods of mechanically charging cupolas, a practice resulting in great saving of manpower, while proving highly satisfactory from a production standpoint. Due to the scarcity of good scrap, Mr. Coltman advised the briquetting of both cast iron and steel turnings for use in the cupola, and quoted figures on melting loss and silica loss in the mixture by the use of this material.

The speaker described in detail his experience in hydro-blasting in the cleaning of large castings and spoke at some length on the use of chills in molding. A lively discussion from the floor on various foundry problems followed Mr. Coltman's remarks.—*John C. Phelan, president.*

Chicago

GROUP discussions of the nonferrous, gray iron and malleable and steel divisions, prefaced by a top-notch general address on the correlation of patternmaking with foundry practice, drew a large attendance at the March 9 meeting of the Chicago Chapter of the A.F.A. at the Top of the Town restaurant.

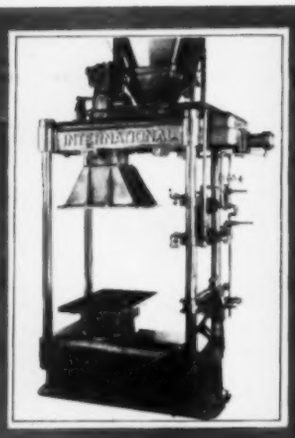
The program also included a guest appearance of National President Herbert S. Simpson, and the annual and always welcome after dinner entertainment of the glee club of the Continental Roll & Steel Foundry Co., East Chicago, Ind., under the direction of James Thomson, chief plant engineer. A surprise feature, aside from the usual drawing for three free dinners, was the reservation card drawing for a $25 defense bond presented anonymously. W. H. Parker, superintendent, American Steel Foundries, East Chicago Ind., was the winner.

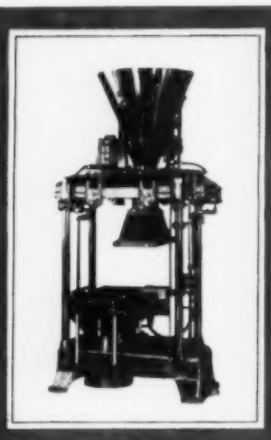
E. J. Brady, chief engineer, Western Foundry Co., Chicago, introduced the subject of patternmaking and its correlation with foundry practice. In his judgment, based on wide experience in both pattern shops and foundries, the planning and manufacture of efficient pattern equipment and core boxes requires complete co-operation between the foundry and the pattern shop. Proper equipment not only determines the success of the job from the economic angle, but, more important, it will produce sound castings that will stand up in service.

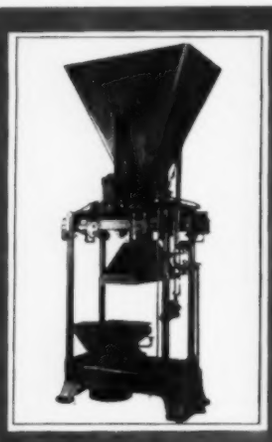
Group discussions were conducted as follows: Nonferrous, chairman, Cliff McKelvey, Chicago Hardware Foundry Co., North Chicago, Ill., leader, Art Thorsen, Liquid Carbonic Corp., Chicago; gray iron and

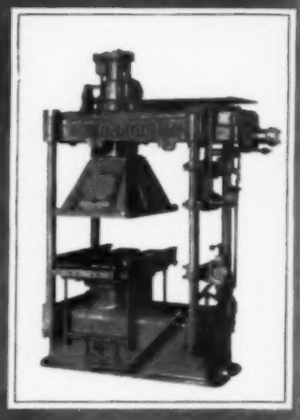
(*Continued on page* 176)

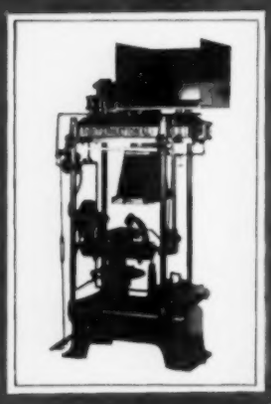
INTERNATIONAL CORE BLOWERS

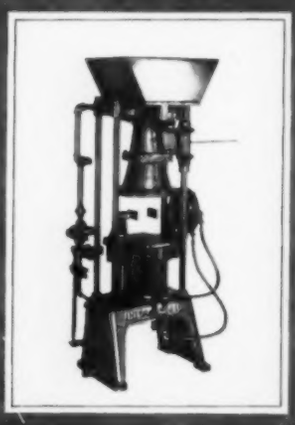


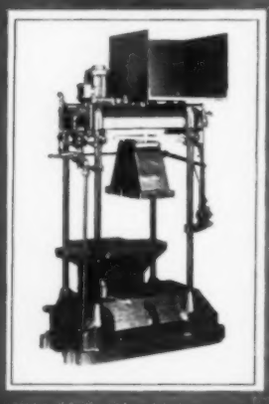












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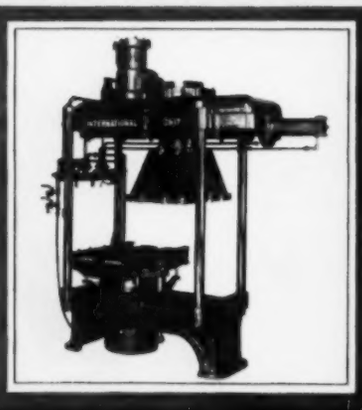

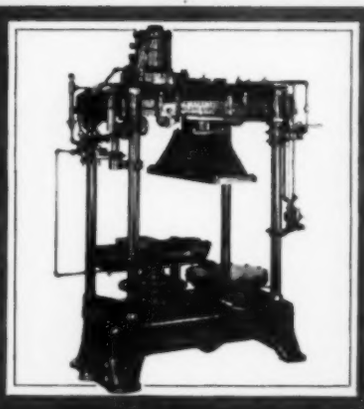

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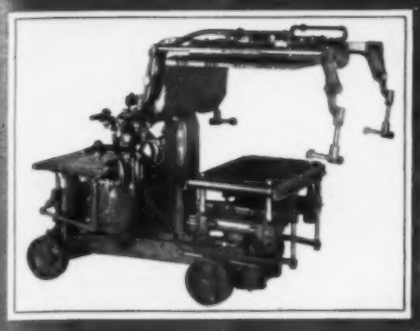
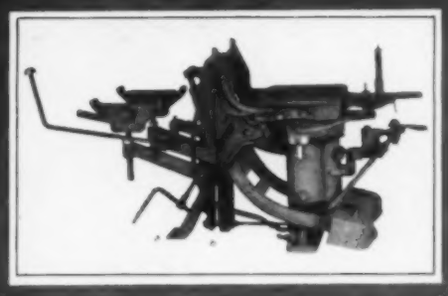
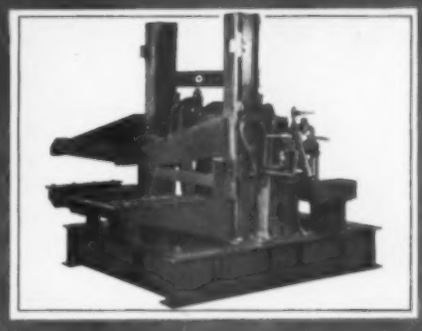

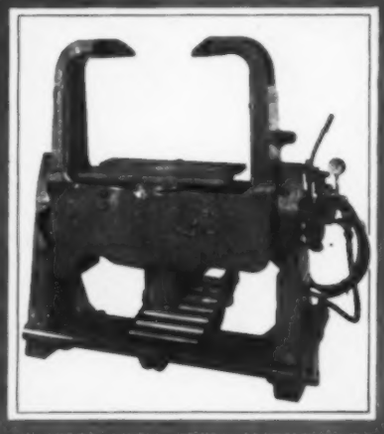

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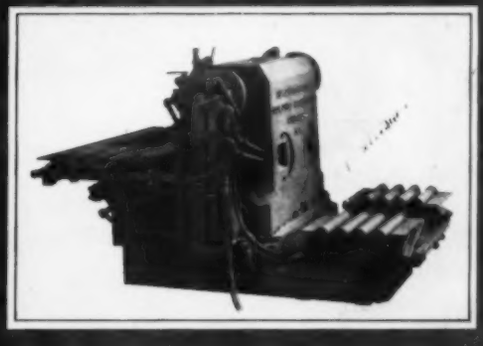
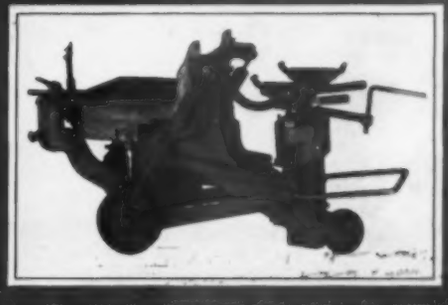

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malleable, chairman, G. B. Stantial, leader, A. F. Heckendorf, both of Illinois Malleable Iron Co., Chicago; steel, chairman, W. H. Parker, American Steel Foundries, East Chicago, Ind., leader, Martin Rintz, Continental Roll & Steel Foundry Co., East Chicago, Ind.

The chapter will hold its Ladies' Night party at the Morrison Hotel, April 11.

Sectional meetings will comprise the April 13 regular meeting. Programs for them are as follows: Gray iron, chairman, H. K. Briggs, Miller & Co., Chicago, "Cupola Practice for High-Test Iron," by Don J. Reese, International Nickel Co. New York; steel, chairman S. E. McGinty, Burnside Steel Foundry Co., Chicago, "Banded Areas in Centrifugal Cast vs. Static Cast," by Prof. L. J. Haga, Illinois Institute of Technology, Chicago; nonferrous, chairman, Cliff McKelvey, Chicago Hardware Foundry Co., North Chicago, Ill., "Sand," by Eugene W. Smith, Eugene W. Smith Inc., Evansville, Ind., and "Top Pouring," by A. K. Higgins, Allis-Chalmers Mfg. Co., Milwaukee; malleable, chairman, G. B. Stantial, Illinois Malleable Iron Co., Chicago, "New Applications for Malleable Castings," by J. Arthur Durr, development engineer, Malleable Founders' Society, Cleveland.—*Erle F. Ross.*

Birmingham

NATIONAL president of the American Foundrymen's Association, Herbert S. Simpson, president, National Engineering Co., Chicago, was honored at the Birmingham District Chapter's regular meeting held Jan. 16. Approximately 135 members and guests were present and Chairman J. A. Bowers presided.

A. S. Holberg, chairman of the membership committee, reported that there were two new members and one reinstatement. T. H. Benners Jr., then gave a report on the apprentice meetings being sponsored by the chapter, and thanked President Simpson for the prizes he had donated, and which he had given personally to increase interest in the apprentice work.

Chairman Bowers introduced L. N. Shannon, a past president of the A.F.A., who then introduced Mr. Simpson. President Simpson brought greetings from the national office and touched on cupola research, castings promotion and the foundry convention. He also challenged those present to find their proper places in the emergency and to meet the obligation. The meeting was then turned over to W. H. Spencer, chairman of the program committee, who allowed several special experts to introduce themselves. Everyone present took an active part in the discussion which was very interesting and instructive. Mr. Spencer then placed President Simpson on the platform to answer any questions on A.F.A. affairs, and during this time Mr. Simpson made the remark that men of importance in industry should stay on their jobs and do a good one for Uncle Sam in their present position.—*H. G. Mouat, secretary-treasurer.*

N. Ill.-S. Wis.

REGULAR meeting of the Northern Illinois-Southern Wisconsin Chapter held Feb. 10, at Hotel Nelson, Rockford, Ill., featured a discussion by Bradley Booth, service metallurgist, Jackson Iron & Steel Co., Jackson, O. Mr. Booth gave a very interesting and informative talk on the "Manufacture and Use of Silvery Pig Iron." He started with the first known examples of iron smelting and traced the history of the process to the present silvery pig iron. He pointed out the availability of coal, iron ore and limestone which influenced the location of blast furnaces near Jackson. The illustrative slides, and exhibit of samples as well as the discussion following Mr. Booth's talk gave interested individuals the opportunity to learn the complete story of silvery pig iron.

A letter from the local Red Cross Chapter acknowledging the contribution from the chapter was read by the secretary.

Personnel relations were discussed at the regular meeting of the Northern Illinois-Southern Wisconsin Chapter of the A.F.A. held at Hotel Nelson, Rockford, Ill., March 10. Approximately 40 members and guests were present and George Minert, Gunite Foundries Corp., Rockford, and chairman of the chapter presided.

Speaker of the evening was Jay Burton, Fairbanks, Morse & Co., Beloit, who talked on "Handling Men." Mr. Burton started with the theory that men expect a supervisor to be interested in them as individuals and to give them a square deal. He elaborated on that point showing that if the men got a square deal in wages, working conditions, credit for good work as well as blame for poor work, etc., the problem of loyalty would solve itself. To sum up, his opening statement, "Give him a square deal," cannot be improved upon.

Next meeting of the chapter will be held at the Hotel Hilton, Beloit, Wis., on April 14. *J. R. Cochran, technical secretary.*

Detroit

FEBRUARY meeting of the Detroit Chapter was held on the nineteenth at Huyler's L'Aiglon restaurant and was designated as Cadillac night. About 100 were in attendance for dinner and the subsequent meeting.

Due to absence from the city, H. B. Swan, Cadillac foundry superintendent, who was to have been chairman of the meeting, was unable to be on hand, but three of his able assistants took over and did a thorough job of summarizing operations and procedures in the Cadillac foundry, which incidentally is continuing operations in spite of suspension of automobile production. W. B. McFerrin, foreman of the melting department, and foundry metallurgist, covered melting and metallurgical phases; L. W. Thayer, assistant superintendent, discussed molding practices and methods of controlling scrap; C. H. Hungerman, core room foreman, gave detailed analysis of core making techniques, sands, mixtures and the like.—*A. H. Allen, secretary.*

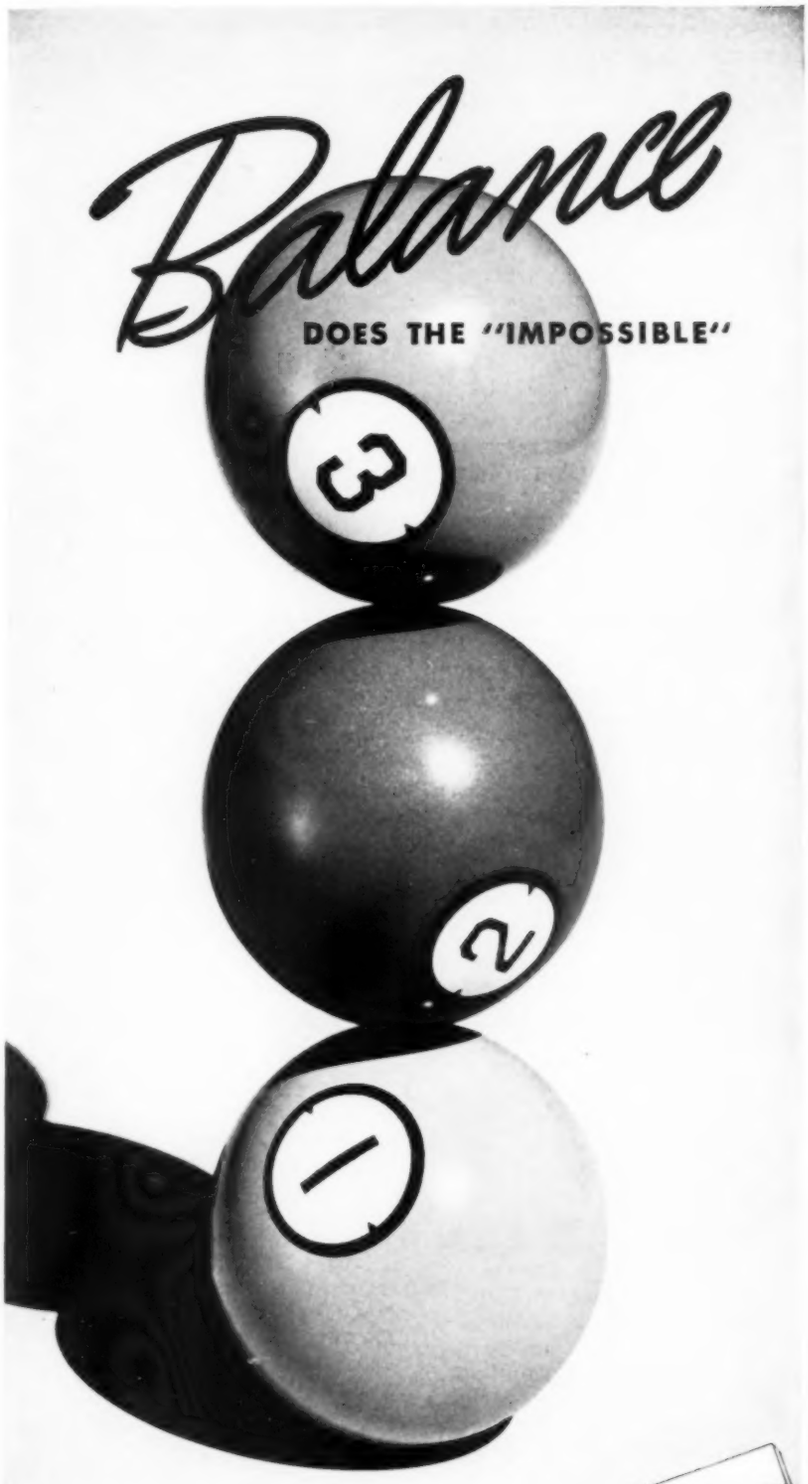
St. Louis

A FINE crowd of members and guests attended the March 12 meeting of the St. Louis District Chapter of the A.F.A. held at the DeSoto Hotel. C. B. Shanley, Semi Steel Castings Co., St. Louis, and vice chairman of the chapter, presided. Out of town visitors were introduced following which the minutes of the regular meeting as well as those of an executive board meeting were read in which several amendments to the constitution were proposed. Attention also was directed to the fact that the board of directors had authorized the purchase of up to $500 of defense bonds on behalf of the chapter.

Membership committee chairman, John Williamson, reported continued activity and mentioned Louis Maier, Missouri Pattern Works, Gus Richter, Reeder & Richter Pattern & Foundry Co., and Harold Sticknote, Fulton Iron Works Co. as new members. The work of the chapter's apprentice training committee was reported on next by Luther Kleber, chairman, who indicated that activity was continuing in preparation for the coming Cleveland convention. Louis Desparois reported for the program committee and in addition to announcing the coming programs, he urged good attendance to wind up the year's activities.

It was announced that Russell Hard, M. W. Warren Co., had enlisted in the Navy. Mr. Hard had

(*Continued on page* 178)



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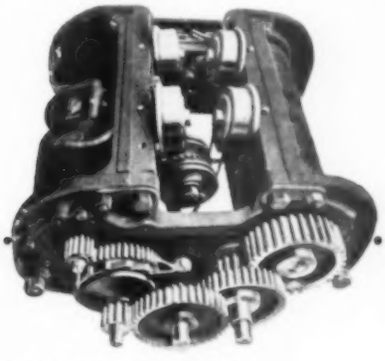
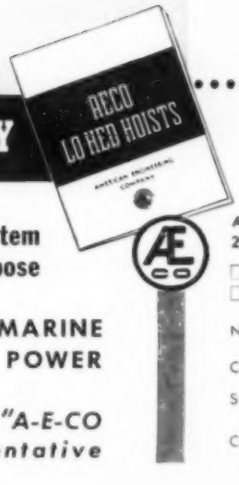
Until the invention of the Lo-hed electric hoist, drawing the hook block up close to the beam was considered impossible. See how the Lo-Hed hoist overcomes this problem. Motor and drum are on opposite sides of the supporting beam. This balanced arrangement allows the hook to be pulled up between motor and drum—until it almost touches the beam, giving you minimum headroom—a desirable plus feature for which you pay no premium. This same arrangement makes possible the use of an all spur gear drive from motor to drum.

Besides these benefits the Lo-Hed hoist has every desirable feature you want in an electric hoist . . . heavy duty hoist motor, ball or roller bearings, automatic holding brake, 100% positive automatic stop when load reaches its upper limit, gearing sealed in an oil bath, a controller proof against fire, dust and moisture, easily removable covers and many others.

The Lo-Hed hoist is built to stand up three shifts a day, 7 days a week—the kind of a hoist you need now. The Lo-Hed you buy today will be going strong long after the war has ended . . . and you want that kind of a hoist too. Send for our catalog today.





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(*Continued from page* 176)
been chairman of the entertainment committee, and Harold Wiese Midvale Mining & Mfg. Co., has been appointed to succeed him as chairman.

The speaker of the evening, Lee E. Everett, Kaukauna Machinery Co., Kaukauna, Wis., was then presented. Lee, as former chapter chairman, was received warmly by the group. His subject, "Foundry Engineering," was a most unusual one. He suggested procedure for the construction and planning of foundry layouts indicating the advantage of sequence layouts, carefully designed floor plans, based upon necessary material handling and other factors which would be of decided advantage and economy to the foundry builder and user.—*J. W. Kelin, secretary-treasurer.*

Central Indiana

NINETY members and guests of the Central Indiana Chapter were present at the regular meeting of the chapter held March 2, at the Washington Hotel, Indianapolis, to hear L. P. Robinson, Werner G. Smith Co., Cleveland, discuss "Variables Which Affect the Baking of Cores."

H. B. Harvey, Indiana Foundry Corp., Muncie, Ind., and chapter chairman presided and B. P. Mulcahy, Citizens Gas & Coke Utility, Indianapolis, and program chairman presided at the technical meeting.

Mr. Robinson emphasized the importance of watching the fundamentals of core baking and the importance of keeping the core oven in condition to bake cores evenly. Mr. Robinson is a very capable and entertaining speaker and has that impressive way of putting over his points.—*R. A. Thompson, secretary.*

Philadelphia

EXPLANATION of methods, applications and results of the use of radiography in inspection of castings was featured at the regular meeting of the Philadelphia Chapter held Feb. 13 at the Engineers Club. Approximately 200 members and guests were present. The after dinner speaker, former governor of New Jersey, Hon. Harold G. Hoffman, was introduced by Lee Harris. Mr. Hoffman has had a wide experience in public affairs, having been a congressman, governor of New Jersey and at present director of unemployment compensation in New Jersey. He is in demand as an after dinner speaker because of his wit and humor and knowledge of current affairs. His talk on present day problems was enjoyed by all.

The technical session was devoted to a discussion on "Radiographic Inspection of Castings", presented in a very able manner by Dr. Gilbert E. Doan, head of the metallurgical department, Lehigh University. Dr. Doan, who was introduced by the technical chairman, Bert Troy, metallurgist, Dodge Steel Casting Co., Philadelphia, is one of the foremost authorities on the use of radiography in testing and inspecting of castings. His work with the Naval Research Laboratory led to the use of gamma rays for radiographic testing. With the use of slides, Dr. Doan explained the methods, applications and results in the inspection of castings. He explained how the foundry can avoid troubles and become in complete control of the quality of castings by the use of the method of testing. By inspection of a pilot casting, correction can be made and defective castings avoided.

An interesting discussion followed in which R. R. Moore of the Naval aircraft factory considered the application of radiography from the foundry standpoint. Norman Mochel, Westinghouse Electric & Mfg. Co., considered the subject from the customer's viewpoint. Numerous incidents were cited where the quality of castings has been improved by the use of radiography.—*B. H. Bartells, chairman, publicity committee.*

Western Mich.

MEMBERS and guests of the Western Michigan Chapter met March 2 at the Occidental Hotel, Muskegon, Mich. for the regular meeting of the chapter. After a dinner attended by about 45 foundrymen, including Duncan P. Forbes, Gunite Foundries Corp., Rockford, Ill., and national vice president of the A.F.A., the meeting was opened by Chairman D. F. Seyferth, West Michigan Steel Foundry Co., Muskegon. Mr. Forbes spoke briefly on the work of the association.

Next was shown the interesting color film "Unfinished Rainbows" through the courtesy of the Aluminum Corp. of America, and "Nickel Highlights" through the courtesy of the International Nickel Co.

Mr. Seyferth introduced William H. Romanoff, H. Kramer & Co., who emphasized the importance of correct gating, pouring temperature and sand control in relation to the type of material used in nonferrous production, going into detail on the various bronzes being produced in the defense program.

Before adjournment, the door prize was drawn and E. L. Smitherman of E. J. Woodison Co. was the lucky one.—*Max A. Amos, secretary-treasurer.*

Quad-City

SIXTY-FIVE members and guests were present at the Feb. 16 meeting of the Quad-City Chapter of the A. F. A. held at the Blackhawk Hotel, Davenport, Iowa.

Principal speaker was John L. Lowe, metallurgist, Battelle Memorial Institute, Columbus, O., who talked on "Cupola Melting Operations." The construction and the operation of the cupola was described by the speaker with many references to research that had been made on problems of the melting of iron in the cupola. Slides illustrating equipment used to combat some of the problems were shown, with charts and tables recording the findings. Practical ideas which the speaker had learned through his contacts with various foundries in the country were presented and proved to be very interesting and educational to the foundrymen of the Quad-City district. Research in cupola practice is becoming an important factor in the production of good castings as was shown by Mr. Lowe's talk.

March meeting of the Quad-City Chapter was held March 16 at the LeClaire Hotel, Moline, Ill. There were 80 present and A. H. Putnam, A. H. Putnam Co., Rock Island, Ill., and chairman of the chapter, presided. A report on the progress of the chapter's membership for the year was made by C. Oberlanderon.

Main speaker was L. P. Robinson, director of core oil sales, Werner G. Smith Co., Cleveland. His topic for discussion was, "Variables Which Affect the Baking of Cores." He gave many of the essential items that should be considered in the baking of cores with regard to the type of oven used, the upkeep and maintenance of core room equipment, materials used including sands, cereal binders, and oil, and measuring and testing of cores. Many practical examples were used to stress the necessity of periodic checks in the core room in order to have proper cores for molds and castings. Other factors also discussed were moisture, temperatures, ratio of mixes, and climatic conditions that might be involved as variables. An interesting and technical question period was conducted with many questions on the various phases of making cores being asked, and many viewpoints from various types of work and foundries being given.

Nominating committee appointed at the meeting consisted of: Hy Bornstein, chairman, L. W. Starner.

(*Continued on page* 185)

The judicious use and conservation of essential materials, such as P. B. SILLIMANITE refractories, are necessary for a united war effort.

We are "All Out" in our effort to supply the P. B. SILLIMANITE requirements of the critical industries. You can do your part in this emergency by anticipating your needs and by limiting orders to actual requirements.

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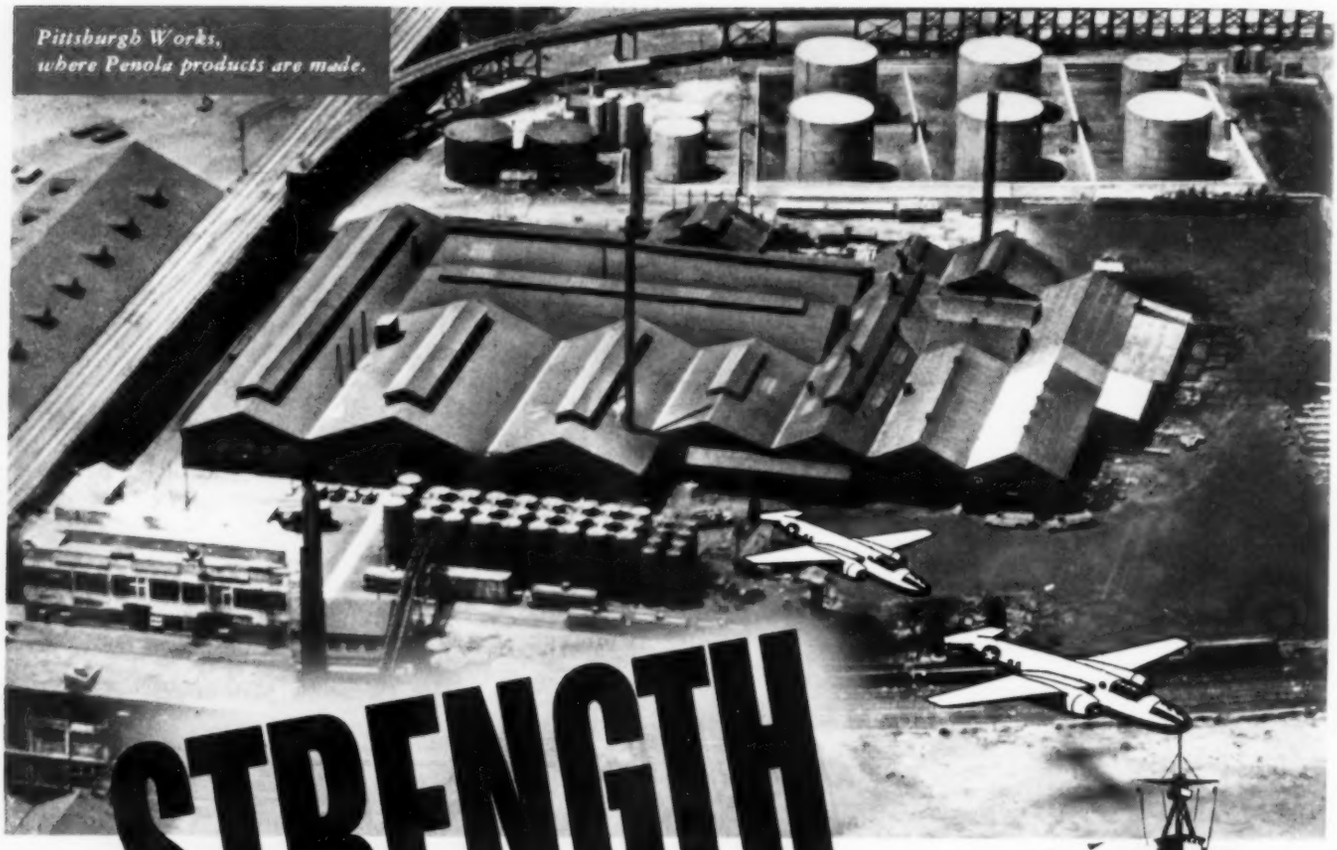

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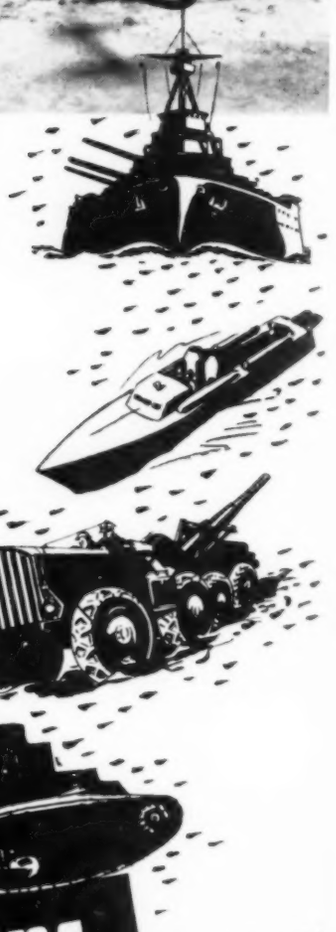

Look for us in the Arcade at the American Foundrymen's Association Convention in Cleveland

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ACTION of the WPB in sending letters to a large number of foundrymen charging them with ordering more pig iron than is being consumed appears of doubtful value in promoting maximum production of castings for our war effort. While there may have been violations of the intent of the pig iron allocation order, I feel certain that many of the plants addressed by the "crack down" letter are operating at full capacity on war business and that every pound of iron received is being poured in war castings. Perhaps a few intelligent inspectors in the field and an example of any flagrant violations, if found, would have accomplished the desired result far more successfully.

Many foundrymen contend that it is impossible to determine accurately the amount of iron needed for one month as early as the fifth of the preceding month. With gray iron castings production limited almost entirely to war work through pig iron allocations, one prominent foundryman has suggested that, except in the case of emergency, no order for castings be filled unless accompanied by an extendable priority rating. With this restriction on production, WPB should find a summary of shipping data sufficient information to authorize pig iron producers to replace the iron which has been used.

—□—

The following items of interest to foundrymen have been announced through the WPB during the past month:

A revised form of application for priority assistance under the Production Requirements Plan has been sent to all companies operating under the plan. Changes are largely technical and include requests for more information. Recent amendments to orders covering procurement of materials in several industries indicate the wider use of the Production Requirements Plan. Those not familiar with PRP should obtain copies of the revised form and instructions from any WPB field office or from the Production Requirements Branch, Bureau of Priorities, Washington.

Order M-61 recently issued by WPB provides that Madagascar flake graphite can be used only for the manufacture of crucibles, and that these crucibles can be used only for the war effort. According to the order foundrymen seeking delivery of crucibles containing Madagascar flake graphite should make application to the Director of Industry Operations on form PD-1A.

Some confusion exists in making out Form PD-1A application. A recent statement from the Director of Industry Operations indicates that applicants must sign properly at the bottom of the first page of the copy marked *duplicate*, and not in the space marked "Certification" on the back of the sheet. The reverse side of the "Duplicate" sheet contains the form of certification which is to be used in endorsement of purchase materials of applicants to whom the rating has been assigned on the PD-1A form.

—□—

Production figures, as released by the Bureau of Census, United States Department of Commerce, indicate the tremendous increase in the demand for malleable and steel castings over the past few years. Production of malleable castings was as follows: 1938—289,914 tons; 1939—480,578 tons; 1940—565,932 tons; and 1941—843,038 tons. Steel casting production was as follows: 1938—342,737 tons; 1939—594,148 tons; 1940—798,947 tons; 1941—1,316,027 tons. Statistics are not available from the Department of Commerce covering gray iron and nonferrous castings.

—□—

Along the home front, where the first skirmishes in the battle of production are being won, approval greeted the suggestion of Donald Nelson that production be increased through around the clock operation. Industry understands the problem, and is sufficiently flexible to respond quickly. A check of the foundry industry indicates some difference of opinion as to the feasibility of full time operations. Many foundrymen believe that maximum production can be secured with two shift operation six days a week, the seventh day being devoted to repairs and maintenance. Of course, certain departments can be operated on practically a three-shift basis.

—□—

Many interesting lessons are taught through the medium of the cartoon. Along that line, the Norton Co., Worcester, Mass., is distributing a semi-monthly cartoon-style bulletin carrying helpful hints on grinding. Ideas on conserving grinding wheels are brought home quickly through the bulletin.

—□—

The tremendous responsibility of the producers of foundry equipment in meeting war demands is illustrated by reports of the Foundry Equipment Manufacturers Association, Cleveland, giving index to foundry equipment orders. The index for new equipment orders in February was 636.6 as compared with 295.9 for February 1941. The index is based on the monthly average of reported sales of equipment to metalworking industries during the years 1937-38-39. When it is remembered that preference rating order P-31 granted manufacturers of foundry equipment for the procurement of materials used in the manufacture of foundry equipment limits sales of such equipment to orders carrying ratings of A-10 or better, the problem of equipment manufacturers in meeting present demands are apparent. I believe that, in general, manufacturers of foundry equipment operating under preference rating order P-31 have been exceptionally successful in meeting the war demands of this nation. It is to be hoped that WPB will continue to provide the necessary assistance to manufacturers so that the necessary materials will be available to produce much needed foundry equipment.

F. G. S.

foundry activities

NATIONAL Industries Inc., 1602 Hanna street, Fort Wayne, Ind., has purchased the plant of the Bass Foundry & Machine Co., Fort Wayne. The latter company will now be known as the Bass Foundry & Machine Division of National Industries Inc. The following comprise the board of directors for the new organization: Albert S. Bonner, executive vice president, Clark Equipment Co., Buchanan, Mich.; E. R. McEnderfer, vice president, Associates Investment Co., South Bend, Ind.; Christian Pretz, assistant to vice president, Studebaker Corp., South Bend; Thomas W. Simmons, chairman of the board, Pacific Iron & Steel Works, Tacoma, Wash.; Bernard Voll, president, Sibley Foundry & Machine Co., South Bend.

* * *

Lehigh Foundries Inc., Easton, Pa., has rebuilt its plant recently damaged seriously by fire.

* * *

Muskegon Piston Ring Co., Muskegon, Mich., is building an addition to its plant.

* * *

Joliette Steel Co. Ltd., Joliette, Que., will soon start work on a foundry addition.

* * *

Sanford-Day Iron Works, Dale avenue, Knoxville, Tenn., recently was damaged by fire.

* * *

Crucible Steel Castings Co., Cleveland, will increase its production space.

* * *

Portland Foundry Co., Portland, Conn., is building an addition to its main plant.

* * *

Hillsdale Foundry Co., Hillsdale, Mich., is building an addition to its plant.

* * *

Wagner & Sons, Dover, O., was damaged by fire recently, with an estimated loss of $90,000.

* * *

Sawbrook Steel Castings Co., Cincinnati, will build an addition to its plant.

* * *

R. H. Osbrink Mfg. Co., Los Angeles, has purchased the foundry division of the Menasco Mfg. Co., Los Angeles. The Menasco foundry for the past few years has been producing nonferrous castings by the Antioch process and more recently has been manufacturing aluminum sand castings.

* * *

Lakeside Malleable Castings Co., Racine, Wis., is rebuilding a one-story, 60 x 60-foot building.

* * *

West Specialty Co., Plano, Ill., was damaged by fire recently with an estimated loss of $7000.

* * *

Watkins Inc., Wichita, Kans., is erecting a steel foundry. Forsblom & Parks, Beacon Building, Wichita, are architects.

* * *

Allis-Chalmers Mfg. Co., Milwaukee, has let contract to Meredith Bros. Inc. for a 26 x 100-foot foundry addition, and alterations.

* * *

A new steel foundry to be operated by Auto Specialties Mfg. Co. St. Joseph, Mich., now is under construction.

* * *

Toronto Foundry Co., 1884 Davenport road, Toronto, Ont., has prepared plans for an addition to its foundry.

* * *

Lynn MacLeod Foundry Co., 203 Notre Dame street, Thetford Mines, Que., W. K. MacLeod, manager, is building a foundry.

* * *

Fahralloy Canada Ltd., 25 King street West, Toronto, Ont., has awarded contract for construction of a foundry building.

* * *

Cockshutt Plow Co. Ltd., Mohawk street, Brantford, Ont., is having plans prepared for another addition to its plant.

* * *

Buick Motor Division, General Motors Corp., Flint, Mich., has begun work on a $10,000,000 aluminum foundry for the production of aircraft engine castings. William G. Mixer will be its superintendent. The foundry was designed by Albert Kahn Inc.

* * *

Bartlett Hayward Division, Koppers Co., 200 Scott street, Baltimore, has had plans prepared for a factory.

* * *

Goderich Iron & Brass Co., Goderich, Ont., was damaged by fire recently. Loss is estimated at $2000.

* * *

Massey-Harris Co. Ltd., Market street South, Bradford, Ont., has received bids for construction of an ordnance plant.

* * *

Bethlehem Foundry & Machine Co., Bethlehem, Pa., R. Miller, general superintendent, is planning a plant expansion.

* * *

A foundry and machine shop to be operated by Continental Roll & Steel Foundry Co. is being constructed at East Chicago, Ind.

* * *

Bohn Aluminum & Brass Corp., Detroit, has awarded contract for the construction of an aluminum foundry and extrusion plant near Los Angeles.

* * *

Price-Pfister Brass Mfg. Co. is the firm name under which M. E. Wartnik has obtained a certificate to conduct business at 3011 Humboldt street, Los Angeles.

* * *

Mueller Brass Co., Port Huron, Mich., has awarded contract to the Austin Co., Detroit, for construction of an office building and a factory addition.

* * *

Eld Metal Co. Ltd., 1233 East Sixty-third street, Los Angeles, has been issued a building permit for construction of a new foundry.

* * *

Sadler Cast Metals Inc., Yonkers, N. Y., has been organized by Rippey T. Sadler, 44 Court street, Brooklyn, N. Y., to produce iron, steel and bronze castings.

* * *

Frontier Bronze Corp., Niagara Falls, N. Y., has adopted a group insurance program which provides

(*Concluded on page* 184)

HAIR LINE CRACKS

REVEALED BY X-RAY WITH

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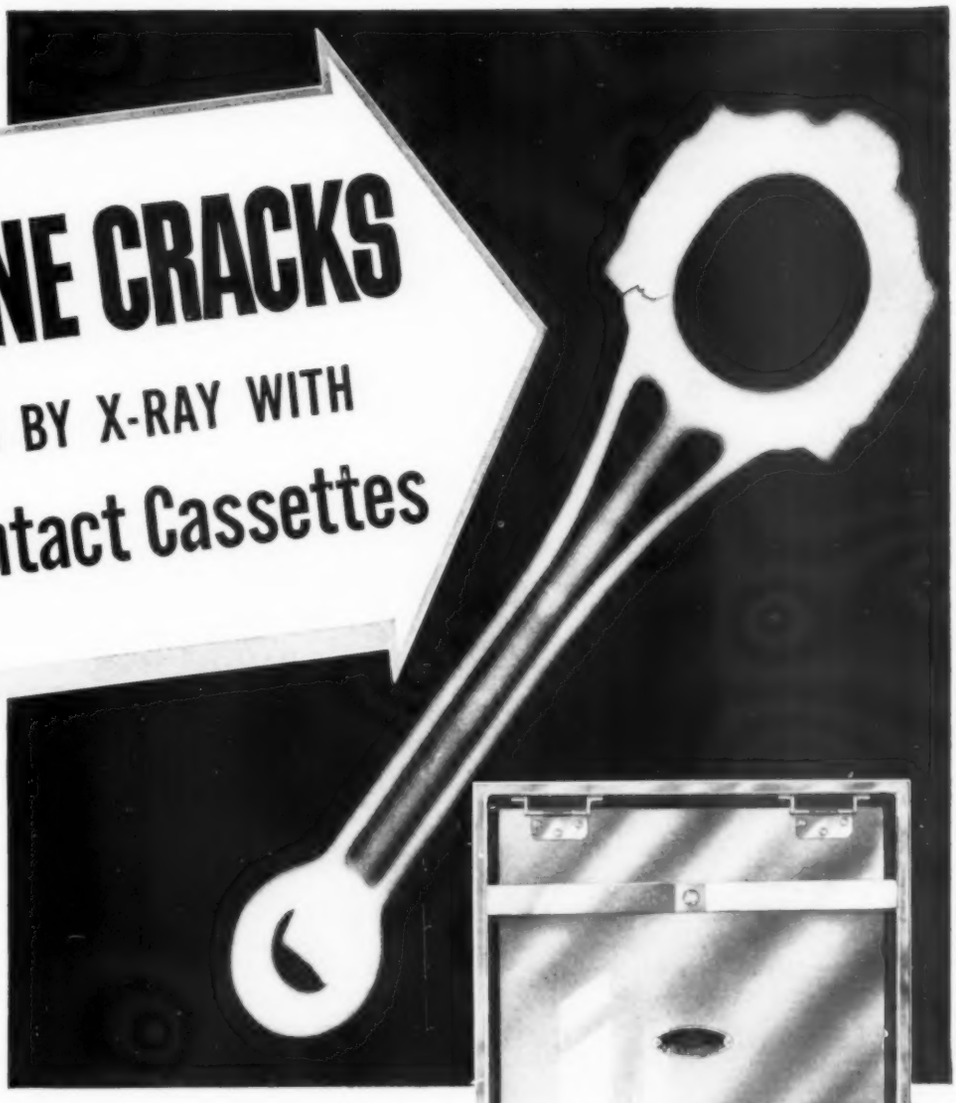

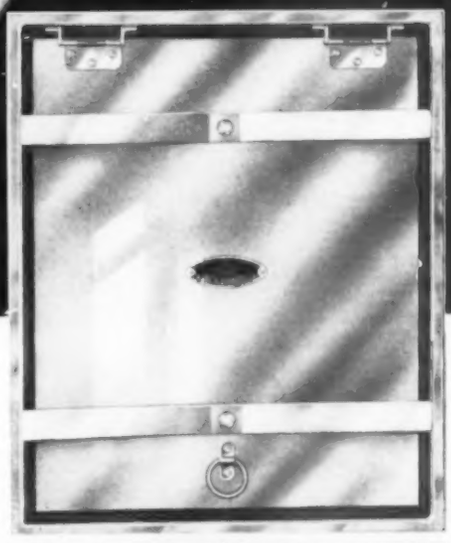

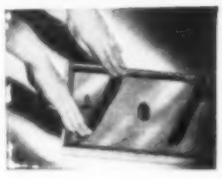

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Hair-line cracks, porosity, gas cavities and blow holes in metal parts can seriously retard your production schedules.

Impossible to detect by surface examination, these "fifth columnist" flaws are instantly revealed when they are subjected to x-ray inspection.

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BEWARE of Heat-Fag . . . that dangerous, insidious force that saps the vitality of workers — brings on fatigue — and in many cases is the direct cause of accidents. Man-hour protection *must* precede production. When men sweat, they lose body salt. As the natural salt balance in the system is disturbed, there is a definite lowering of efficiency. The worker tires — becomes inalert — careless. A slight mistake and — another costly accident is chalked up. Heat-Fag again takes its toll.

AVOID HEAT-FAG··USE MORTON'S SALT TABLETS

QUICK DISSOLVING
(less than 30 seconds)
This is how a Morton Salt Tablet looks when magnified. Examine one—see how soft and porous it is inside. When swallowed whole — with a drink of water, they dissolve in less than 30 seconds.

Wherever workers sweat, Salt Tablets are needed, for they represent the simple, easy way to replace salt that's lost through sweating and hard work.

Case of 9000 10-grain salt tablets, ... **$2.60**

Salt-Dextrose Tablets, case of 9000 . . . . . **$3.15**

Order from your distributor—or directly from this advertisement.

Place MORTON'S DISPENSERS at all Drinking Fountains
They deliver salt tablets, one at a time, quickly, cleanly — without waste. Sanitary, easily filled, durable. 500-tablet size, **$3.25.** 1000-tablet size **$4.00**

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FREE Sample Tube
Write—on your firm letterhead — for a pocket size sample tube of Morton's Salt Tablets and for the new folder — "Heat-Fag and Accidents Ride Together."

EVERYONE WHO SWEATS NEEDS SALT

(*Concluded from page* 182)
employes of the concern with life insurance, supplemented by sickness and accident benefits. The program is being underwritten by the Metropolitan Life Insurance Co., New York, on a basis whereby the employer bears the cost. Ernest H. Holzworth, president of Frontier Bronze Corp., announced the plan.

* * *

Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa., has let contract for construction of three new building units to the Turner Construction Co., Birdsboro.

* * *

Fisher Brass Foundry is the firm name under which John L. Fisher, Ralph F. Fisher and Clifford A. Fisher have obtained a certificate to conduct business at 5332 Santa Fe avenue, Los Angeles.

* * *

National Malleable & Steel Castings Co., Sharon, Pa., has awarded contract to H. T. Osborne, Miller Park, Franklin, Pa., for an addition to a factory building somewhere in Pennsylvania.

* * *

Western Foundry Co., 3634 South Kedzie avenue, Chicago, is equipping its plant to produce steel castings, and is installing a 1½ ton electric furnace, two converters and a cupola. Between $150,000 and $200,000 is being spent in the program.

* * *

Maritime Brass & Bronze Works has been incorporated in Los Angeles county, with a capital of $75,000. Directors are: A. N. Thomas, Grace M. Thomas, J. A. Robinson, and Sydelie Robinson, all of San Pedro, Calif.

* * *

Aelco Brass Foundry Co., Inc., 1966 South Fourth street, Milwaukee, has started construction of a new melting room addition as the first of a series of expansion moves. W. H. Brown is vice president and general manager.

* * *

Iroquois Foundry Co., Racine, Wis., organized in July, 1930 by John C. Juras, August C. Vierthaler and Robert L. Niess has become the property of Messrs. Juras and Vierthaler through purchase of Mr. Niess' interest in the business and his retirement.

* * *

Wayne Foundry Co., 5922 Epworth boulevard, Detroit, has purchased the building and adjoining property at the southeast corner of Michigan and Hubbard avenues, Detroit. The building, of 12,000 square feet, is being remodeled for a nonferrous foundry. It is expected that the plant will be in operation within 60 days. Plans are being made for the erection of a magnesium plant.

Foundry Group Activities

(*Concluded from page* 178)

and W. E. Jones. Nominations for officers, directors and trustee will be given at the April meeting.

Next meeting of the chapter will be held one week earlier than scheduled because of the A. F. A.'s annual convention, and will be at the Fort Armstrong Hotel, Rock Island Ill., Monday, April 13.—*J. Morgan Johnson, secretary-treasurer.*

Ontario

AT THE meeting of the Ontario Chapter of the A.F.A. held in Hamilton, Ont., Feb. 27, L. P. Robinson, Werner G. Smith Co., Cleveland, discussed variables which affect the baking of cores. Chairman N. B. Clarke, Steel Co. of Canada Ltd. presided at the meeting with an attendance over the 100 mark. The speaker was introduced by J. J. McFadyen, chapter vice-chairman, Galt Malleable Iron Co. and the vote of thanks was proposed by J. Sully, Sully Brass Foundry Ltd. Membership committee chairman, Don Barnes, William R. Barnes Co. Ltd., announced eight new members who had joined the Ontario Chapter since the previous meeting.

Mr. Robinson pointed out that in the early days of core room practice, many foundries built their own core-ovens, in which the distribution of heat frequently resulted in burning some cores while in other sections of the oven baking would be incomplete. Since that time, there has been a great improvement in core ovens resulting from a realization of the importance of core baking.

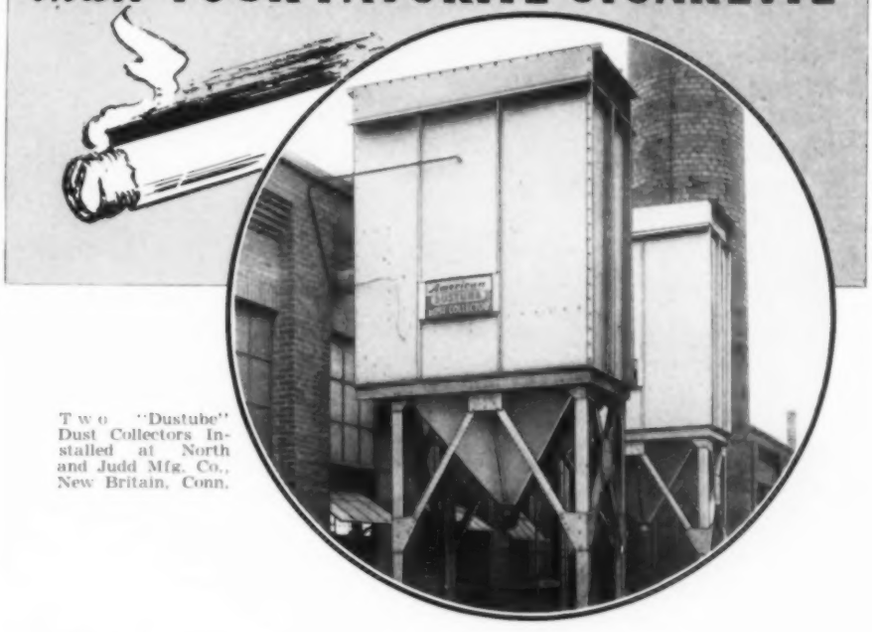
There is no necessity for a foundry to lose castings on account of the cores. If a core is not good there should be no hesitation in throwing it out. This is particularly true in the case of intricate core assemblies where one poor core may ruin an important core assembly.

When cores come from the oven underbaked in spite of exposure to an adequate temperature for a sufficient length of time, it is desirable to investigate the oxygen supply. It requires approximately 1000 cubic feet of air to oxidize one pound of core oil and it may be that the admission of additional air to the core oven will overcome the difficulty.

If the oxidation of the oil in the core is incomplete during baking, the oxidation will be completed when the casting is poured, and that is when blows occur. In core

TRAPPED!

DUST PARTICLES SO SMALL *that* 300 BILLION WEIGH LESS *than* YOUR FAVORITE CIGARETTE



Two "Dustube" Dust Collectors Installed at North and Judd Mfg. Co., New Britain, Conn.

HARMFUL foundry dust particles range between 0 and 20 microns in size. Just how small is that? According to eminent authorities it takes in the neighborhood of 300 billion of these particles to weigh one gram, or roughly the weight of a cigarette!

To control particles as infinitely small as these requires a dust collector of exceptionally high efficiency. But, small as they are, such particles cannot escape the arresting action of "Dustube" cloth bag type dust collectors.

Results in hundreds of foundry applications prove that "Dustubes" meet the most exacting requirements. *Efficiency by weight:* 98% and more; *efficiency by dust count:* discharged air shows less than ten million particles per cubic foot from 2 to 10 microns in size, (as determined by the impinger method).

Write for New "Dustube" Catalog No. 62.

AMERICAN FOUNDRY EQUIPMENT CO.
505 S. BYRKIT ST. — MISHAWAKA, IND.

DUSTUBE
DUST COLLECTORS

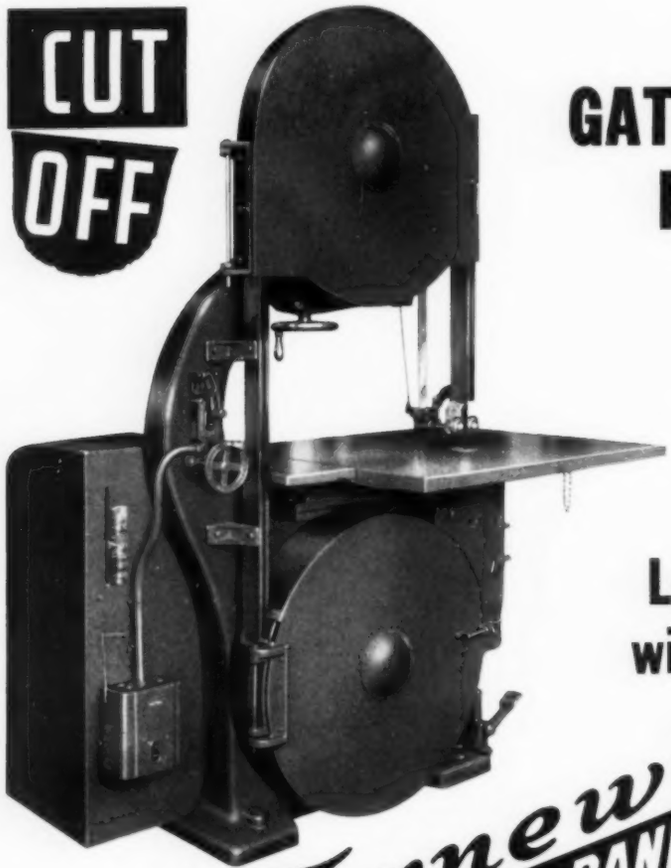
room operation it is a good plan to calculate the time under current operation which can be allowed for the baking of cores. Whenever possible, it is well to allow for a period of baking that is somewhat on the long side.—*G. L. White, secretary.*

Metropolitan

WITH varied and interesting questions flung at them from every corner, the experts retaliated with valuable information at the March 2 Quiz Program of the Metropolitan Chapter of the A.F.A., held at the Essex House, Newark, N. J.

James Vanick, International Nickel Co. was technical chairman for the evening. The board of experts consisted of R. J. Allen, Worthington Pump Co., K. V. Wheeler, American Steel Casting Co.; T. J. Wood, American Brake Shoe Co., F. Biasotti, Neptune Meter Co. who substituted for D. Broggi of that company; and Don J. Reese, International Nickel Co. Tolerances, sand selection and preparation, directional solidification, porosity, grain size, physical properties and all other aspects of foundry practice were discussed. The relative merits of castings versus forgings also were considered. The questions were many and covered all types of castings so that all those present benefited by the questions.

The April meeting was to have been a regional conference with the Philadelphia and Chesapeake Chapters, but due to present conditions, the conference has been postponed. Instead, there will be a regular monthly meeting on April 6, at which time H. G. Lampker, supervisor of foundries, Wright Aeronautical Corp., Paterson, N. J., will talk on "Nonferrous Castings for Aircraft."—*R. E. Ward, assistant chairman, publicity committee.*



CUT OFF

GATES and RISERS in any metal

in far Less Time with

Tannewitz METAL CUTTING BAND SAWS

Variable Speed

Models to fit Every Need

In addition to our regular High Speed Band Saws delivering over 2 miles of smooth vibrationless saw travel per minute, which have proved so exceedingly popular in automotive and aviation work, the TANNEWITZ line now offers five other models to provide the fastest cutting medium for every foundry need: a 30" machine to provide any speed from 300 to 900 blade feet per minute—a similar machine with 3-step V-belt drive to give 2300, 3100, 4000 blade feet per minute—a 36" machine with 32" capacity under the guide—a model with 48" wheels and one with 52" wheels, operating at 3,000 blade feet per minute for handling extra large castings. Get a line on the TANNEWITZ metal cutting band saw that fits your particular needs. It will save time, step up production and repay its cost dozens of times. Write for full particulars NOW!

THE TANNEWITZ WORKS, GRAND RAPIDS, MICHIGAN

N.E. Ohio

APPROXIMATELY 125 members and guests attended the March 12 meeting of the Northeastern Ohio Chapter at the Tudor Arms, Cleveland. Guests included C. E. Hoyt, convention and exhibition manager and C. E. Westover, executive vice president and treasurer from the association office, Chicago. Following the usual list of announcements Mr. Westover delivered a short address on the aims and object of the coming A.F.A. convention and exhibition in Cleveland April 20 to 24. He said that all preliminary features were well in hand and indicated that the event in all probability would exceed in magnitude and general interest any affair of the kind staged in the forty odd years of the association activities.

A film *Unfinished Rainbows* in technicolor showing the origin, experimental work, and development of aluminum to its present status in myriad uses in practically all fields of human endeavor was presented through the courtesy of the Aluminum Company of America. Not the least interesting feature of this program was the apathy shown by prospective manufacturers when approached by Charles Hall in an endeavor to have them adopt the new metal. The universal use of the metal today shows that Mr. Hall had the mental equipment comparatively rare among inventors, vision, resourcefulness, commercial and practical knowledge, implicit faith in his product and the gift for selling.

The technical part of the program was covered in a paper on cupola control and recent developments in the production of special iron through the use of alloys presented by R. C. Good, metallurgical engineer, Electro Metallurgical Co. Pittsburgh. He prefaced his re-

marks by comparison between former and present foundry conditions brought about by war emergency and the resulting restrictions and priorities. In the majority of instances casting specifications are higher than ever and the foundryman is faced with the problem of meeting these higher casting qualifications with base materials which require skillful manipulation of alloy additions. He described cupola operation in considerable detail to show how melting practice affects the resulting iron. Gas absorption, the cause of porosity is influenced by three factors, temperature, melting speed and composition of the charge. Where alloys are added before or after tapping, the metal should remain in the ladle a sufficient time to allow them to act.—*Pat Dwyer, vice chairman, publicity committee.*

Student Chapter at Minnesota

As an experiment, the University of Minnesota Student Chapter of the A.F.A., Minneapolis, held its regular dinner meeting Feb. 26, without having an outside speaker on the program. Instead, two members used the occasion to tell the groups about their recent trips. Jarl Havnen told about his visit to the Lynchburg Foundry Co., Lynchburg, Va., where he will be located after April 1, and Leo Brom told of his trip to the Cleveland plant of the Aluminum Co. of America, where he will be located after June 1. Following the discussion of both cast iron and aluminum foundry practice, the group adjourned to the bowling alleys in the new Coffman Union where an informal bowling contest was held.—*Sidney S. Silberg, secretary.*

Book Review

How Your Business Can Help Win the War, edited by Hartley W. Barclay, paper cover, 111 pages, published by Simon and Schuster, New York, for $1.00.

While the picture at Washington continues to change so rapidly that it is difficult to present information complete in all details, this compilation does offer a vast amount of information of great value to the manufacturer seeking data on the war effort and industry. The publication is announced as a practical guide book designed to help our government meet total war needs by showing business men what the government wants to buy, how to bid, how to get contracts and subcontracts, and how to cut time in dealing with government offices. A guide to priorities, allocations and prices also is included.

Make man-hours and man-power count more effectively—get more production every hour of the 24-hour working day. Put Standard Conveyors to work—let them do the transportation in your plant—provide for a smooth, uninterrupted flow of materials and parts from receiving platform to machines—department to department—assembly or packaging lines to shipping floor.

Standard Conveyor engineers can help you plan and install conveying equipment in your plant that will speed production—relieve costly congestion of work in process—accelerate the production pace all along the line.

Booklet Shows Variety of Conveyor Applications and Possibilities:

Send for booklet F-4 "Conveyors by Standard"—a valuable reference book on conveying and conveying methods—contains many installation pictures representing practically all industries—suggests best types of conveyors to use for particular applications.

STANDARD CONVEYOR COMPANY
General Offices: North St. Paul, Minn.
Sales and Engineering Offices in Principal Cities

FIRST FOR FASTER PRODUCTION

"THE STANDARD OF VALUE"

Standard CONVEYORS

Obituary

EDMUND S. GARDNER, president of the Hartford Electric Steel Corp., Hartford Conn., who died recently in Boston was born in Columbus, O. He attended the public schools in Hartford, and upon graduation joined his brother-in-law, Gilden Osborne who had formed the Illinois Steel Corp. in Chicago. Together they developed the first electric steel furnace. Mr. Gardner later became consulting engineer for the American Manganese Corp., San Francisco, subsequently going to Manila, Philippines, as president of the Atlantic Gulf & Pacific Steel Co., a position he held for several years before joining the Hartford concern in 1927. He was elected president of the Hartford Electric Steel Corp. in 1930. Mr. Gardner was a member of the American Steel Society and the Steel Founders Society of America.

* * *

Frank J. Opatrny, 46, for the past 5 years Cleveland representative, Frederic B. Stevens Inc., Detroit, and prominent in foundry activities in the Cleveland district, died March 20, at Cleveland Clinic hospital. Mr. Opatrny was born in Cleveland in 1896. Following his early association with the foundry industry, he was connected with several foundries in Cleveland, including the Fulton Foundry & Machine Co., and the Cuyahoga Foundry Co. Previous to his association with the Stevens company, he was Cleveland representative of the Beardsley & Piper Co., Chicago.

* * *

Epley T. Fisher, 66, former president, C. H. Hoppe Foundry Co., Chicago, died Feb. 26 in that city.

* * *

Howard A. Mullett, 61, president and general manager, Bradley Washfountain Co., Milwaukee, died Feb. 27.

* * *

William J. Chandler, 60, vice president and assistant secretary, Hansel-Elcock Co., Chicago, died March 9.

* * *

Charles A. Zentgraf, 56, for 12 years superintendent, Hill Acme Co., Cleveland, died March 12, at his home in Cleveland.

* * *

Everett R. Hamilton, 57, president and general manager, National Pressure Cooker Co., Eau Claire, Wis., died Feb. 24.

* * *

Arthur W. Wilkinson, 66, assistant treasurer, James B. Clow & Sons, Chicago, died at his home in that city, Feb. 20. He had been associated with the company 33 years.

* * *

August Ziesing, 84, former president of American Bridge Co., a United States Steel Corp., subsidiary, died recently at his home in Glencoe, Ill.

* * *

Thomas Cunningham Sr., retired superintendent of the former Elizabeth Foundry Co., Elizabeth, N. J., subsidiary of the General Electric Co., died Feb. 28 in that city. Mr. Cunningham retired in 1932.

* * *

Morris S. Towson, 76, president and general manager, Elwell-Parker Electric Co., Cleveland, manufacturer of industrial trucks, died March 17 in Orlando, Fla. Mr. Towson first joined Elwell-Parker in 1895 as a draftsman.

* * *

Henry W. Robbins, 71, president of the Bignall Mfg. Co., Medina, N. Y., died in that city recently. Mr. Robbins was born in Pen Yan, N. Y., July 31, 1870. In 1901 he went to Medina where he became associated with his brother, the late William B. Robbins, in the operation of the Bignall company.

IN STOCK

FOR IMMEDIATE SHIPMENT

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FALLS MANGANESE COPPER. (All Grades)
FALLS SILICON COPPER. (All Grades)
FALLS PHOSPHOR COPPER. (10% or 15% Shot or Waffles)
FALLS MANGANESE BRONZE HARDENERS.
(to meet every requirement)
FALLS ALUMINUM BRONZE HARDENERS.
(to meet every requirement)
FALLS SILICON ALUMINUM 50/50
FALLS COPPER ALUMINUM 50/50 - 40/60 - 20/80
FALLS COPPER NICKEL 50/50
FALLS No. 25 ALLOY. (a new densifier for Brass or Bronze)
FALLS NICKEL ALUMINUM 20/80
FALLS TITANIUM ALUMINUM. 5% Titanium.
(makes solid Aluminum castings)
FALLS FERRO ALUMINUM 50/50. and other percentages
FALLS MANGANESE ALUMINUM 25/75. and other percentages
FALLS No. 11 ALLOY.
(produces Copper Castings with high conductivity)
FALLS No. 14 ALLOY. (makes castings leak proof)
FALLS No. 15 ALLOY.
(a deoxidizer for Nickel Silver and Monel)
FALLS No. 26 ALLOY. (makes solid Aluminum Bronze castings)
FALLS No. 55 ALLOY. (to make perfect Red Brass castings)
FALLS ELECTROLYTIC COPPER SHOT.
(for Gray Iron. Malleable. and Steel)

We solicit your inquiries for these or any other alloys. We carry over three hundred alloys in stock for immediate shipment, and have an annual capacity of 36,000,000 pounds.

America's Largest Producer of Alloys

★

NIAGARA FALLS SMELTING & REFINING CORPORATION

OFFICE, LABORATORY AND WORKS
BUFFALO, NEW YORK

Upon the death of his brother in 1907, Mr. Robbins was named to the presidency, which position he held up to the time of his death.

* * *

Edward T. Fishwick, vice president and director, Worthington Pump & Machinery Corp., Harrison, N. J., died March 15 at his home in Glen Ridge, N. J. Mr. Fishwick had been with the company for 50 years, starting in the firm's Cincinnati plant. He had been a vice president for 20 years.

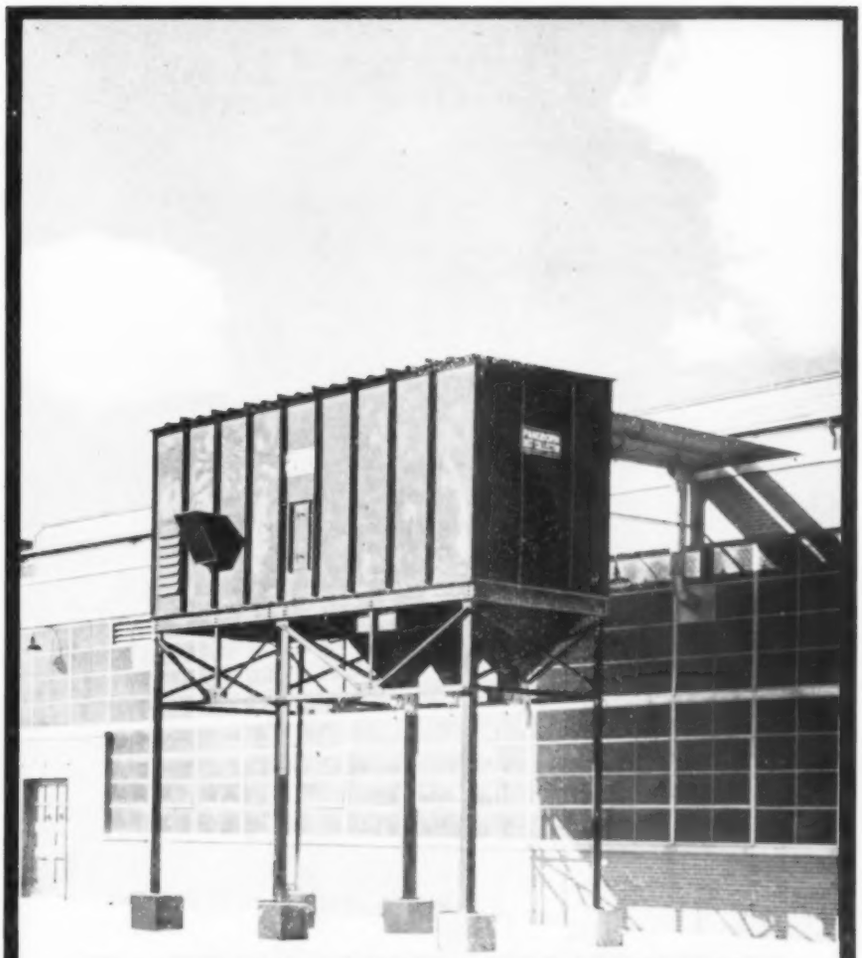
Conduct Studies on Foundry Chemistry

The National Radiator Co., has founded a fellowship at Mellon Institute, Pittsburgh, to conduct studies in the fundamental chemistry of foundry practice. Dr. W. A. Pennington has been assigned to study the basic chemical reactions involved in the production of cupola iron and in its heat treatment. Correlations will be made between the chemical composition and the physical properties of the iron to effect all possible improvements in plant practice as well as in the finished product. Research in heat treatment will be conducted to develop methods for manufacturing materials which will lead to a broader field of adaptability for cast irons. For the most part the studies of Dr. Pennington are conducted in the plants of the National Radiator Corp., at Johnstown, Pa.; Framingham, Mass:; Dunkirk, N. Y.; New Castle, Pa.; and Trenton, N. J.

Apprentice Training

American Foundrymen's Association, 222 West Adams Street, Chicago, recently has published reprint No. 41-27 in its management series which presents proceedings of the 45th annual convention on the subject of "Apprentice Training In Foundries." The following papers are included in the reprint: "Apprentice Training in the Defense Program" by W. F. Patterson; "What the Foundry Apprentice Should Be Taught as Related Foundry Instruction" by A. L. Armantrout; "What May Be Taught the Foundry Apprentice as Related Pattern Instruction" by K. F. Ode; "What May Be Taught the Pattern Apprentice as Related Pattern Instruction" by F. C. Cech; "What May Be Taught the Pattern Apprentice as Related Foundry Instruction" by George Gedeon.

Pyrometer Instrument Co. recently has moved to larger quarters at 101-105 Lafayette St., New York.



A DUST FREE PLANT

WILL PRODUCE MORE WORK FOR VICTORY!

NOW—more than ever, it is essential to keep men and machines at capacity production by maintaining working conditions at their peak to eliminate lost time.

Pangborn Dust Control systems are doing this job—effectively and economically—in both war and civilian industries. Men, machines and materials are safe from Dust menace when protected with Pangborn installations. A dust-free plant will produce more work for VICTORY. Write.

PANGBORN

WORLD'S LARGEST MANUFACTURER OF DUST COLLECTING AND BLAST CLEANING EQUIPMENT

PANGBORN CORPORATION · HAGERSTOWN, MD.

TRAINING MOLDERS

For War Requirements

By PAUL R. RAMP

IF we expect to have a sufficient number of good molders to take care of the increased demand on foundries caused by the volume of war work now under way and to come, we must train more men and boys to become molders and core makers.

The writer has given the various methods of foundry teaching a great deal of time and study, and believes he is qualified to offer a few suggestions to improve and speed up this work.

Only two places can be used as a base; the vocational school and a regular foundry. Both are doing good work, but the methods are not quite the same.

What the boys should be taught is speed and short cuts; why castings are bad and how to make them good. Speed does not necessarily mean that they should be overworked.

As near as possible the school should be conducted in the same manner as a regular foundry making commercial castings; where the students are put on what might be termed a paying basis as quickly as possible. This can be done by specifying the time that should be spent on a certain mold or number of molds. When the learner has reached this goal he should be given more difficult work. A student who can make a difficult mold in a three-part flask is of no great value if it takes him all day to do a job which in a commercial foundry must be made in one hour in order to sell it at a profit.

Explain the Details

For the student to become able to reach this goal, he should be given a practical demonstration of each detail involved in making the mold. He must be shown how to place the pattern on the pattern board; locate the drag section of the flask; riddle and tuck the sand around the pattern; ram drag; strike off the mold; place the bottom board in the proper place; clamp the rammed drag ready for rolling over; provide a bed of sand for the mold to rest on; roll over the mold; make the parting; put the cope flask in position; also gate and riser pins; put on parting material; riddle sand on cope side of pattern; set gaggers and add enough sand for tucking bars; tuck bars; fill cope for the first ramming with pean rammer; prepare the sand for butting or butt ramming the cope; remove gate and riser sticks and prepare the down gates; vent cope; take off cope and place it safely on horses; clean off joint of mold with brush; swab the pattern; rap and draw the pattern; cut connections to gates and risers; place cores and carry off vent from cores; put cope back on the drag mold and clamp mold ready for pouring; and to tell why every operation is necessary.

The entire group of students should be present at these demonstrations. These details are more important than they realize, until they get into a regular jobbing shop where every move counts. The majority of vocational schools take care of this work. No criticism can be offered only to say that in some cases the question of time required to do the work is not considered important.

Class work helps. With a group of students paying close attention,

All Out War Against Axis Aided By Robins Shake-outs

Important Plants Put In Many Units

Two Models For Continuous Or Pick-up Operation

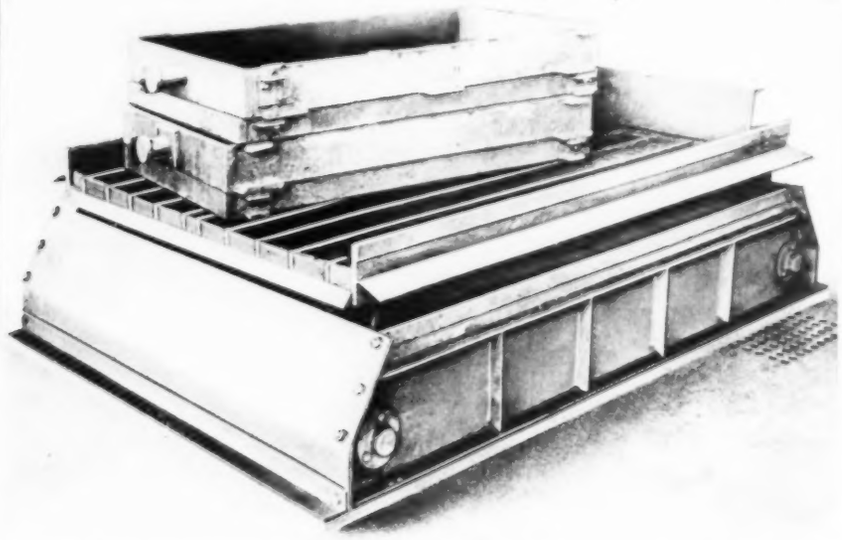
A wide range of sizes of Robins Shake-outs, both standard and special, have been successfully installed in various war plants. The main reason given for the selection of these units was the insurance against lost time provided by the many safety features built into each Shake-out.

New "Full-Floating" Feature Eliminates Overloading Danger

Heavy Coil Springs Carry All Loads

(*Special to Robins*)

PASSAIC, N. J., 1942 — Latest developments in Robins Shake-outs indicate maximum safety for both operator and machine, according to users. These Shake-outs are completely accessible with no protruding shafts, bearings, drive equipment or structural frames extending beyond the Shake-out surface. The vibrated frame, entirely supported on coil springs, is therefore extremely smooth-running and definitely protects the bearings from accidental overloads. This cushioning action also greatly reduces the possibility of flask breakage.



ROBINS designs and constructs Apron Conveyors, Bucket Elevators, and many other products for foundries, including screens for cleaning sand and removing gaggers or parts of gates, risers, or cores; also Belt Conveyors with or without special Idlers such as the patented RUBBERDISC Return Idler or the famous Robins Belt Trainer. Write direct to Robins for specific information.

ROBINS CONVEYING BELT COMPANY, Passaic, N. J.

the instructor can do some very effective work by demonstrating the how and the why of making a mold. The demonstrations always should show the quickest as well as the safest method to make the mold.

In some places there is a lack of interest in the molding trade. The young men turn to other work that appeals more to them. This in a large measure is the result of inability to sell them the trade; to make them realize that molding is not only a trade but also is an art, full of mystery and even romance. While we are doing wonders in the foundries today, more wonderful things are yet to come. We have only scratched the surface. It will be up to these young men to further develop the foundry that has in the past played such an important part in the development of our country and the world. It is our patriotic duty to do all we can to get the younger generation interested in the molding trade and the foundry business in general.

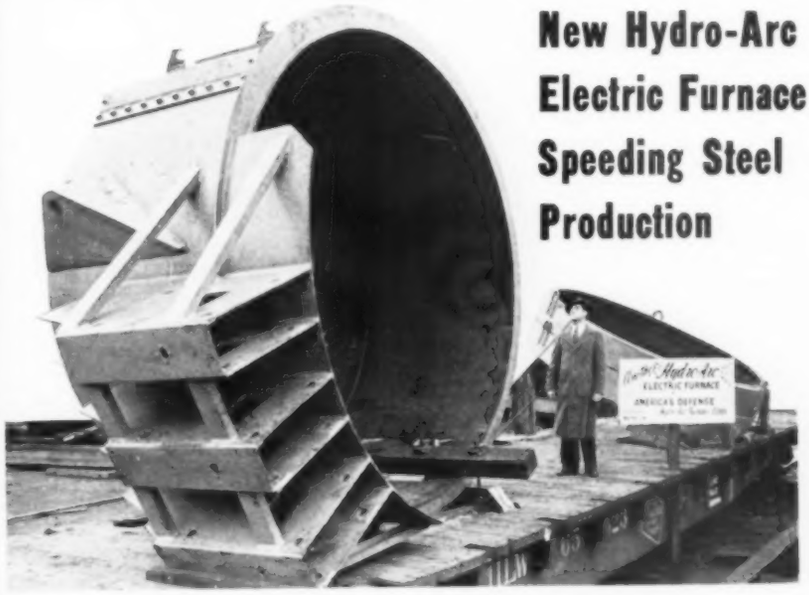
Show Right Way

A great deal depends upon how an apprentice is started in the foundry; whether in the vocational school or in a regular foundry making commercial castings. One way is to allow him to loaf around the shop for a week or two learning what it is all about by observation. This is a mistake. Another plan is to put him to work with an experienced molder, and another way is to start him on his own, molding the first day under an able instructor. The latter is the best plan because he becomes interested at once and goes home the first day with his head full of molding. He tells his family what he did and how it came out, and what he is going to do. His boy friends are told, and later he shows them the *good luck* horse shoe he molded and cast with his own hands. Some of them decide to become molders and make things like that horse shoe. When they get into the foundry school, and the proper plan is used to get and keep them, the problem of getting students will be solved.

Success of the plan to start the apprentice working with an experienced molder all depends upon how much the molder is interested in him or in apprentice boys in general. In the majority of cases when a boy is put with a molder all he does is a helper's job. He shovels sand, hunts gaggers, and rods, and watches the molder do what he is itching to do himself. The boy becomes disgusted and uninterested. One day I found a boy leaning on his shovel looking at a molder working. I asked him what *he* was doing. He answered wearily "I am doing the heavy looking on."

In selling the trade to a group of

Now in Operation!



New Hydro-Arc Electric Furnace Speeding Steel Production

Shipped in late November to a prominent foundry, this Hydro-Arc Furnace now in daily production serving its country . . . and another one just like it is being rushed to completion for the same plant.

HYDRO-ARC

ELECTRIC FURNACE

Uses low inertia air for counterbalancing to cooperate with a simple accurate hydraulic control to operate each electrode. The few moving parts of this combination have no stretchable steel cable nor limit switches to watch.

Results! Low upkeep—less surging—less electrode wash and more accurate metal making, at lowest cost.

★ SUB-STATION REVISION of present furnaces.

Defense speed-up may mean overloads on present transformer equipment, resulting in burnouts and costly shutdowns. You may enlarge your transformer to do your faster operation without overheating.

W. Harvey Payne

W. HARVEY PAYNE
President and General Manager

HYDRO-ARC FURNACE CORP.

Associated with WHITING CORPORATION

9 South Clinton Street — Chicago, Illinois

boys, they must be started molding at once, to keep them interested from day to day. A meeting should be held at least once a week with the superintendent presiding. Each boy should have some questions to ask about the trade to be answered by another boy or by the superintendent.

A scrap committee appointed to serve at least three weeks will present a report, a record of all bad castings regardless of who made them, the cause of the defect and the proposed remedy. This committee will inspect all defects in castings during the week. They are at liberty to ask the foreman or the superintendent for advice on the defects and remedies they do not understand. This scrap committee handled properly will do wonders in making good molders and keeping up a lively interest.

A blackboard can be used sometimes, but not as a regular feature. Too much chalk talk does not appeal to the boys. The meetings are more successful when they are held on the boys' own time in the commercial foundry. They automatically speed up the work so they can go home, otherwise a long dragged out meeting is the result.

When it is possible to work the young men on dry sand molds, they very quickly pay their own way. With fewer hazards, poor ramming, venting and finishing, and as the dry sand work generally is confined to large parts, the boys are very proud of their work. Not long ago we had 60 milling machine beds on order. In less than two weeks two young men with very limited foundry experience made one of these molds every day.

In my opinion there is not much excuse for not training men for molding or for not being able to get them interested.

GOLD PLATED shovels are not so uncommon as you might suppose. You have seen them time and again in foundries cutting and piling molding sand.

At first glance they might look like ordinary shovels, but that is because you didn't know how much they actually cost in labor time—**time** that cost much more than the gold with which they might have been plated—**time** that could have been saved with a Sandcutter.

Shoveling in any form is expensive. The Sandcutter eliminated this operation more than 30 years ago. Since then over 1200 users have profited by it. There is no doubt that it can do as much for you. Why not investigate it soon?

AMERICAN FOUNDRY EQUIPMENT CO.
505 S. BYRKIT ST. MISHAWAKA, INDIANA

AMERICAN SANDCUTTERS

Reader's Comment

Readers are invited to comment upon articles and other editorial material appearing in THE FOUNDRY. *The editors cannot publish unsigned communications, but at their discretion may permit a writer to use a pseudonym when a bona fide reason exists for withholding his identity. Letters should be brief.*

THE EDITORS

Makes Bayberry Wax

TO THE EDITORS:

In the February issue of THE FOUNDRY in the Questions and Answers column, there was a query in regard to a bayberry wax solution. I think the following is the answer the questioner was looking for:

Melt a quantity of bayberry wax about the size of a hen's egg. Pour into two quarts of good gasoline. This solution may harden but may be redissolved with more gasoline.

Caution: Don't try to heat the gasoline or the solution.

W. L. TODD
Foundry Instructor
Pasadena City Schools
Pasadena, Calif.

May Try Again

TO THE EDITORS:

Pat Dwyer's article on blowing molding sand into cores in March issue of THE FOUNDRY is most interesting. This article might start many men back to work on the problem in the belief that, with persistence, they might succeed where they previously failed.

If naturally bonded molding sand or fire clay bond or western bentonite is used, they will again fail because these materials do not produce a sand with high enough flowability. Also, some of them have such high dry strength that they cannot be shaken out from restricted areas.

It does appear that only southern bentonite gives high enough flowability and collapsibility for this type of application. It is readily

available from many sources and it is not essential to use any particular brand. But—it is vitally important that the foundryman pick this right type of clay if he is to have hope of success.

N. J. DUNBECK,
Vice President
Eastern Clay Products Inc.
Elfort, Ohio

Creates Interest

To THE EDITORS:

You might be interested to know that several universities have been building cupolas after reading my article "Construction and Operation of a 15-inch Cupola" which appeared in the August, 1941 issue, and I have had many favorable comments concerning it. I have learned recently that the Navy was planning to build a furnace similar to this cupola for use on a repair ship with the Pacific Fleet. I thought perhaps you would like to know how much interest this article has created in various universities and industries.

FULTON HOLTBY
Assistant Professor
Mechanical Engineering
University of Minnesota,
Minneapolis

Timely Suggestion

To THE EDITORS:

I have read your editorial in the February issue of THE FOUNDRY magazine entitled, "Time Most Important Factor in Battle of Production," with a great deal of interest.

Your urging of a change in specifications to permit the use of converter castings is still more timely now that Singapore has fallen.

Certainly the converter has great possibilities for tonnage, flexibility, adaptability to present gray iron foundries, low first cost and speed in getting into production on steel castings of quality.

ROBERT S. HAMMOND
Vice President
Whiting Corp.
Chicago

Book Review

A.S.T.M. Standards 1941 *Supplement, Part II Nonmetallic Constructional*, fabrikoid, 426 pages, 6 x 9 inches, published by the American Society for Testing Materials, 260 South Broad street, Philadelphia, and available for $3.00.

This volume is the second supplement issued to the 1939 *Book of Standards* published by the society dealing with nonmetallic materials for constructional purposes. In addition to the book itself a number of stickers are provided for pasting in the 1939 book and 1940 supplement on such standards and tentative standards which have been revised or replaced and included in the present volume. The book contains 76 standards of which 39 are newly adopted and 37 are replacements, and 50 tentative standards of which 35 are replacements, and 15 are published for the first time.

Material in the book is arranged in double columns which makes easy reading. Various standards and tentative standards are indexed under subject and numerically so that they may be located without difficulty.

Safety and Hygiene

American Foundrymen's Association, 222 West Adams Street, Chicago, recently has published reprint No. 41-28 of its management series which present proceedings of the 45th annual convention on "Safety and Hygiene." The text includes the following papers: "Good Practice in the Medical Control of Foundry Workers' Health" by Donald E. Cummings; "Industry Progress Through Co-operation" by Roger Williams; and "Report of A. F. A. Industrial Hygiene Codes Committee" by James R. Allan.

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LONG-LYFE Nozzle

$8.00 EACH F.O.B. Factory (For 3/8" size and under)

- SAVES 25% TO 400% ON FIRST COST ALONE
- USES CERAMIC INSERT OF NEARLY DIAMOND HARDNESS
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"ALL OUT" IMPROVEMENT is the simplest description of the new American-Heanium Nozzle—the first big advancement in years. The Ceramic Insert is so hard it will scratch many of the hardest cutting tools. Think what that means to increased nozzle life and improved performance. Being a ceramic, the insert conserves costly metals and alloys for the National Defense Program.

The Jacket, surrounding the insert, is a big improvement, too, because it is made of the same abrasion-resisting alloy steel used in the famous airless WHEELABRATOR.

These features and others add up to one thing—***more profit to you.*** What we are offering is a quality product at a sensible price. There is no need to pay more. Write for new descriptive Bulletin No. 17.

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AMERICAN-HEANIUM NOZZLES

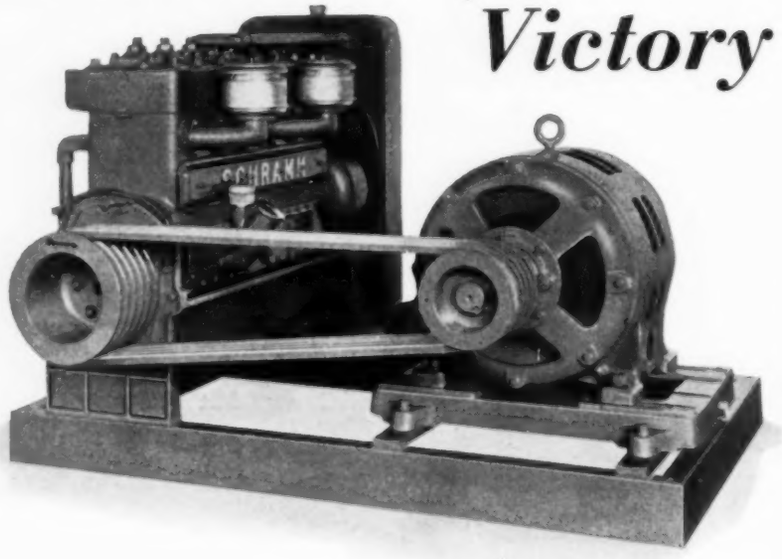
Book Review

A.S.T.M. Standards 1941 *Supplement, Part I Metals*, fabrikoid, 597 pages, 6 x 9 inches, published by the American Society of Testing Materials, Philadelphia, and available for $3.00.

During the intervening years in the trienial period between editions of the *Book of Standards*, the American Society for Testing Materials issues supplements to bring the latter up-to-date, and this particular volume deals with standards and tentative standards relating to metals. In addition to the book itself, an extensive collection of stickers are included to be pasted on indicated pages in the 1939 *Book of Standards* and the 1940 *Supplement* where changes have been made, and the new or revised version published in the present book.

This book contains 45 standards of which 19 are newly adopted and 26 are replacements of existing standards. It also contains 81 tentative standards of which 41 are replacements and 40 are published for the first time. The volume follows the double column arrangement for the presentation of text which was adopted previously, and which aids in reading. Material contained is listed by subject and by standard number so that any particular standard may be located easily.

AIR *for* *Victory*



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SCHRAMM *Air Compressors*

Sandblast Hose

B. F. Goodrich Co., Akron, O., has developed a new sandblast hose of electrically conductive rubber and synthetic rubber compounds which it is claimed carries away static electricity as fast as it forms. For the high voltages of static electricity it is claimed the new compound is practically as good a conductor as metal. It is also claimed that it not only carries away the high static charges, but is highly abrasion resistant to the sharp sand particles. The new hose is made in four ply construction, with ¼-inch tube, in sizes ranging from ¾ to 3 inches diameter.

Plastic Material

The Nuplastic Co., 1707 West Hubbard street, Chicago, has developed a plastic material which can be used to repair damage to or to effect alterations in wood or metal foundry patterns. Features claimed for the material are tough texture, ready moldability, prompt adhesion by finger pressure to any dry surface regardless of smoothness, no shrinkage, self-smoothing finish, no drying out, and increasing tenacity with time. It is stated the material can be dissolved in naphtha and used to seal wood surfaces, thus making it a shellac substitute. The plastic material is packaged in convenient sections for small applications and does not dry out.

Pickle Testing

Industrial Instruments Inc., Jersey City, N. J., is marketing a new instrument for measuring the strength of pickle baths. Readings are obtained directly by turning a knob until the magic eye indicates balance. The readings are in terms of sulphuric acid concentration. The instrument is calibrated for 0 to 10 per cent. Other ranges of calibration are available. Electrical contact with a precise volume of the solution is established by a rubber dip cell with nickel electrodes. Where it is desirable to leave the cell in the solution, a glass conductivity cell with platinum electrodes, mounted in a stainless steel sleeve is screwed into a ¾-inch pipe thread in the side of the tank. The same checkup technique may be applied to many other industrial solution concentrations where the electrical conductivity can be translated into direct readings. It is claimed the instrument can be operated with speed and accuracy by any workman.

Time Tells of Cast Products in War

The foundry industry continues to receive an ever increasing amount of favorable publicity on the application of castings to defense production. The following, from the March 16 issue of *Time*, was headed, "Casting vs. Forging" and is reproduced by special permission of the editors of that weekly publication:

First, welding began to replace riveting in ship- and plane-building (*Time*, Dec. 15). Now cast steel is replacing forged steel, and in tanks it is replacing both riveted and welded armor plate. Engineers call this technological shift "little short of a revolution."

Said Ford's chief metallurgist, Russell H. McCarroll, last week: "By making an airplane cylinder barrel as a centrifugal casting instead of a forging, we helped break all four of the main bottlenecks in production: materials, time, skilled manpower and machine tools."

Pound or Pour? Sample military gadget is a machine-gun trunnion block, on which the gun swivels. When it is forged, i.e., pounded, into rough shape out of a hot chunk of steel, it weighs 20 pounds. In machining the block into shape, 14 pounds of steel is drilled, planed and ground away before the crude lump becomes a finished 6-pound trunnion block.

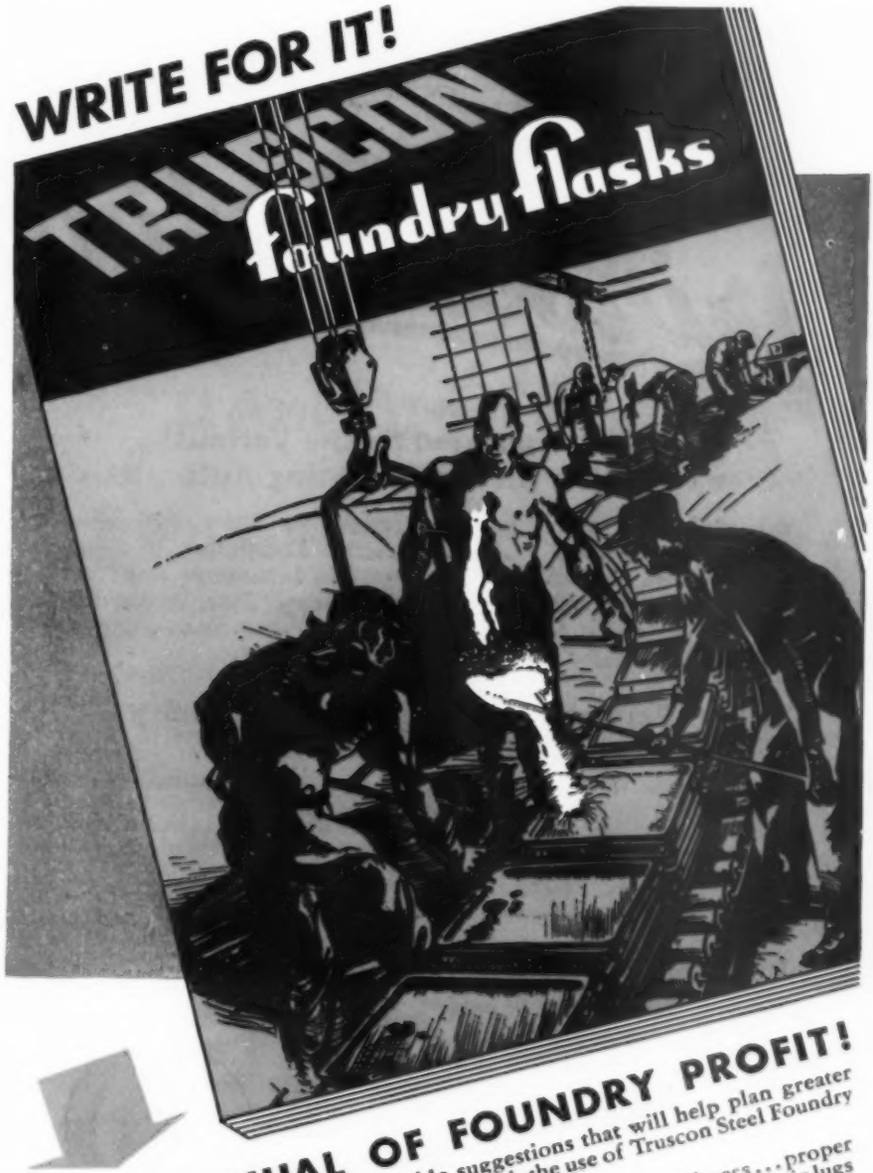
If the same part is cast instead of forged, it weighs only 11 pounds before machining, because molten metal can be poured into nooks and crannies where no trip hammer can force it. So only 5 pounds—about one-third as much—of steel remain to be tooled away. Result: a 35 per cent saving in skilled man-hours (according to Metallurgist Carl F. Joseph of General Motors), plus a corresponding 35 per cent increase in the capacity of machine tools.

Castings began to replace forgings on a big scale in 1932 when Ford first poured V-8 crankshafts instead of hammering them. Since then 10,000,000 Ford crankshafts have been cast with such success that many another part is made in the same way. But the trend toward casting did not get up real speed until many foundrymen last year began to fear that war contracts, escorted by priorities, would pass them by without a nod.

Abolition of the automobile industry might well have closed down a midwestern auto specialties plant had not this foundry begun casting 60-mm. U. S. and 3-inch British mortar shells, a practice unthinkable in World War I. Mortar shells must be of precise dimensions and exacting metallic analysis so they will burst into fragments not too large and not too small to insure maximum bloodshed. Hence they had always been forged, and many an ordnance officer swore they couldn't be cast: cast steel is full of pores and bubbles, it shrinks in its molds to non-uniform sizes, its metallic structure is unreliable.

All this was true—in 1918. But the metallurgist's laboratory, now equipped with such things as powerful X-ray machines to study flaws in castings, has replaced the foundry foreman's rule-of-thumb. Says Detroit Metallurgist E. C. Troy, "The foundry engineer has been able to improve his product almost beyond recognition."

Spinning Guns. "The U. S. today leads the world in the science of gun-making," says Brigadier General Rolland W. Case, Commandant of the Watertown (Mass.) Arsenal, and he gives most of the credit to replacement since 1918 of forging by centrifugal steel casting. (First used in the U. S. in 1902 in making railroad wheels at the American Steel Foundries plant in East St. Louis.) Steel for cannon is poured into horizontal molds which whirl rapidly until the metal hardens. Impurities are forced to



A MANUAL OF FOUNDRY PROFIT!

This book contains many valuable suggestions that will help plan greater profits for foundries of every size, through the use of Truscon Steel Foundry Flasks for light, medium or heavy castings.

Truscon features include correct flask wall thickness . . . proper placing of flanges . . . correct types of handles and pin lugs . . . complete in-built strength to resist heavy daily punishment . . . low upkeep and repair expense. Write for the Truscon Foundry Flask book.

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the hollow center of the barrel, where they are easily bored away, and blowholes and shrinkages are avoided.

"A single casting machine will turn out several gun tubes in the time it takes to forge one," says Case, and machining time is cut 25 to 40 per cent. "Reduction in weight is considerable," he adds, "and is used in many guns to regain mobility."

Centrifugally cast cylinder barrels will be used in all of Ford's Pratt & Whitney engines by this month's end. Both Army and Pratt & Whitney engineers—mindful of the old cast-iron stove lid, which was almost as brittle as glass—were leary of steel castings until Ford testers showed that, while forged barrels burst at 5000 to 7000 pounds per square inch, centrifugally cast barrels burst at 9000 to 10,000 pounds. "Moreover," said a Ford engineer last week, "$10,000 worth of centrifugal dies will turn out as many cylinder barrel blanks as a $110,000 forging hammer." Landing gear for bombers is also centrifugally cast by Ford.

Armor. Casting U. S. tank turrets and hulls, heretofore riveted or welded together from steel plate, gets rid of another traditional prejudice against cast steel: that it couldn't successfully be toughened by heating and quenching. About one-third of U. S. tanks are now built of cast armor, and all of them would be, if foundry and machining facilities were adequate.

The advantages of cast armor are that (1) there are no rivets, which a direct hit may drive into the interior of a tank, where they ricochet, as deadly as bullets, (2) it allows a goodly weight saving by eliminating angle-pieces and overlapping necessary for riveting plates together. Unlike welded armor, cast armor has no seams of uncertain toughness. And, unlike both riveted and all-welded armor, cast armor can have rounded corners to deflect glancing shells.

IMPORTANT ANNOUNCEMENT TO THE FOUNDRY INDUSTRY:

Tripoli Parting

Its Use Approved by the Various Compensation Insurance Rating Authorities

• If you are a user of parting, please note that you can now use genuine Tripoli Parting. Effective December 31, 1940, the National Council on Compensation Insurance amended the Occupational Disease Schedule Rating Plan, approving the use of Tripoli *from the deposits of the Seneca, Mo. area.* Most states have followed their ruling.

Tripoli Parting Unexcelled in the Foundry Now Available to Aid Production

Over the years, it has been indicated that pure, unadulterated Tripoli (found only in the Seneca, Missouri area) makes the most satisfactory and dependable parting. Its many advantages are well known to foundrymen. Tripoli's moisture and heat-resisting properties are unequalled. A little goes a long way—a light dusting is sufficient for difficult, deep lifts, and smooth, clean-surfaced castings result. Light in weight, Tripoli Parting is definitely more economical, less expensive.

Buy Genuine Tripoli Parting from Leading Foundry Supply Houses

Leading supply houses can furnish you with genuine, high grade Tripoli Parting made from the original Barnsdall "Seneca Standard" Tripoli. For certain satisfaction and your own protection, be sure to get parting made from Barnsdall "Seneca Standard" Tripoli.

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Book Review

The Foundry, by W. W. Young, Department of Mechanical Engineering, Stanford University, California; paper, ring type, loose leaf, 99 pages, supplied by the Stanford Bookstore, Stanford University, Calif., for $1.75 plus five cents sales tax.

This manual, originally written in 1935, revised and enlarged in the present 1941 edition, was compiled especially for the Stanford engineering students taking foundry practice. The scope of the work has been limited to the time available for instruction in the course. Purpose of the text is to familiarize the student with the different metals suitable for casting, to teach him fundamental principles of the design and construction of patterns and castings, and to impart as much general information on foundry practice as possible in the allotted space.

General character of the work is shown in the table of contents: Casting metals, pattern design, molding department, core shop, cleaning department, molding machines, ferrous metals, cast iron, melting cast iron, steel foundry, testing laboratory, brass foundry, aluminum, malleable iron foundry, questions, references. For the purpose for which it was compiled the manual is a highly commendable piece of work and might be studied with profit by many practical foundrymen. The chapter on electric furnace operation should prove exceptionally acceptable to superintendents, foremen and others in plants where electric furnaces have been installed recently.

Atlantic Chemicals & Metals Co., formerly located at 221 West Twenty-seventh street, Chicago, has moved to 2362 North Leavitt street, Chicago.

SPEEDING WAR PRODUCTION

(*Continued from page* 109)

50 year service buttons will be presented to those eligible to register.

To further the war production efforts of the industry, the members of the A.F.A. have co-operated earnestly in preparing a program of some 47 sessions. A large number of papers, reports, lectures and addresses will be presented by the foremost foundry authorities on metallurgy, research, shop factors, management and training.

Since the convention is the first Western Hemisphere Foundry Congress, one feature will be a session devoted to papers on foundry practices in Central and South America, which will be held at 8:00 p.m. on Monday, April 20. Preceding the session at 5:30 p.m. a reception will be tendered to guests from Latin American countries, and their councils and official representatives in the United States.

Opening the meeting of the convention will be held at 11:00 o'clock on Monday, April 20, with Chairman H. F. Simpson, president of the American Foundrymen's Association, and Vice-Chairman, D. P. Forbes, vice president of the association, presiding. President Simpson officially will open the Congress after which the visitors will be welcomed to the city of Cleveland. Of special interest at that session will be a talk by Col. Harold M. Reedall, deputy district chief, Cleveland Ordnance District Office, U. S. Army. Annual business meeting and the awards lecture will be held at 10:00 o'clock Wednesday, April 22, at which time President Simpson will give his presidential address, and the reports of the various offices of the Association will be heard. Also gold medals will be awarded to A. L. Boegehold, John E. Galvin, and life memberships to R. M. Allen, and Pat Dwyer. Further details relating to the awards will be found on pages 124 and 125. Following the presentation of the awards, the annual awards lecture will be given.

The annual lecture course series this year will be devoted to core practices and theories, and will be given by H. W. Dietert, Harry W. Dietert Co., Detroit. The lectures will cover material which will be published in book form by the association, and will constitute a complete discussion of the various phases of core practices and theory. Lectures will be given at 4:30 p.m. each day during the week.

A timely session on plant protection and defense will be held on Wednesday, April 22, at 2:30 p.m., and will be devoted to the presentation of a report by the A.F.A. committee under the chairmanship of James R. Allan, International Harvester Co., Chicago, reviewing a code of recommended practices for the protection of industry during the war. Mr. Allan's committee had been requested to prepare this code co-operating with the U. S. Office of Civilian Defense.

Need for intensive training methods of workmen and foremen caused by expansion of plant production will be discussed at three sessions. Wm. F. Patterson, chief, Federal Committee on Apprenticeship, Department of Labor, Washington, will discuss training methods for war production at 11:45 a.m. Thursday, April 23. Donald F. Lane, Supervisor of Training, Bethlehem Steel Co., Sparrows Point, Md., will talk on foundry apprentice problems of industry on Tuesday, April 21, at 10:00 a.m. while O. F. Carpenter, associate district representative, Training Within Industry, Detroit, will follow with a question and answer period on all training problems. Foremen training will be discussed

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by William Odom, William Odom Associates, Chicago, and V. J. Swanson, Tractor Works, International Harvester Co., Chicago, at a dinner on discussion which will be held at 6:30 p.m. on Tuesday, April 21. Mr. Swanson will talk on "Why Foremanship Training?" while Mr. Odom's subject will be "Teaching Foremen to Teach."

Two instructional courses will be held on shop practices in gray iron and sand control. One sponsored by the gray iron division will relate to shrinkage of iron castings and will be held at 9:00 a.m. on Tuesday, Wednesday, and Thursday, April 21, 22 and 23. The other will cover fundamentals of sand control practice and will be given by William G. Reichert, American Brake Shoe & Foundry Co., Mahwah, N. J. The courses will be held at 9:00 a.m. on Tuesday, Wednesday, Thursday and Friday, April 21, 22, 23 and 24.

The sand research committee will hold 3 sessions on Wednesday, April 22 at 8:00 p.m., Thursday, April 23, at 10:00 a.m. and Friday, April 24 at 10:00 a.m. Those meetings will deal with reports of findings on various phases involved in the technical control of foundry sands. The cost methods committee of the association, following its past practice, will sponsor a roundtable discussion on Thursday, April 23, at 10:00 a.m., on current cost methods of the various branches of the industry.

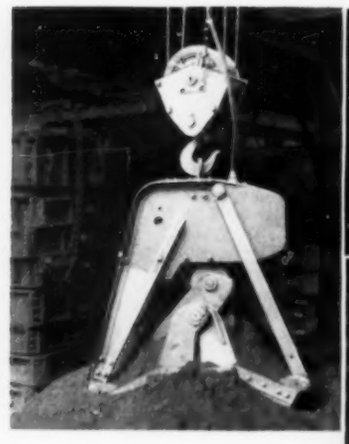
The committee in co-operation with engineering schools will hold a dinner meeting followed by a session at 6:30 p.m. Wednesday, April 22, to bring together those who are directing foundry instruction in engineering colleges. The session will include a report on a survey of engineering school instruction and foundry practice, and two addresses. One will be given by S. D. Moxley, American Cast Iron Pipe Co., Birmingham, Ala., on "Engineering Graduates in the Foundry," and the second will be presented by C. J. Freund, dean of engineering, University of Detroit, Detroit, on "The College Student Views the Foundry as an Occupational Opportunity."

The pattern making division which recently was organized will sponsor two sessions devoted to pertinent and timely problems of pattern production on Monday, April 20, at 8:00 p.m., and on Tuesday, April 21, at 2:30 p.m. The A.F.A. cupola research committee will hold a session on Thursday, April 23, at 10:00 a.m. at which time will be presented several reports prepared by the committee in its program of getting together the latest and most authoritative information on cupola operation and theories.

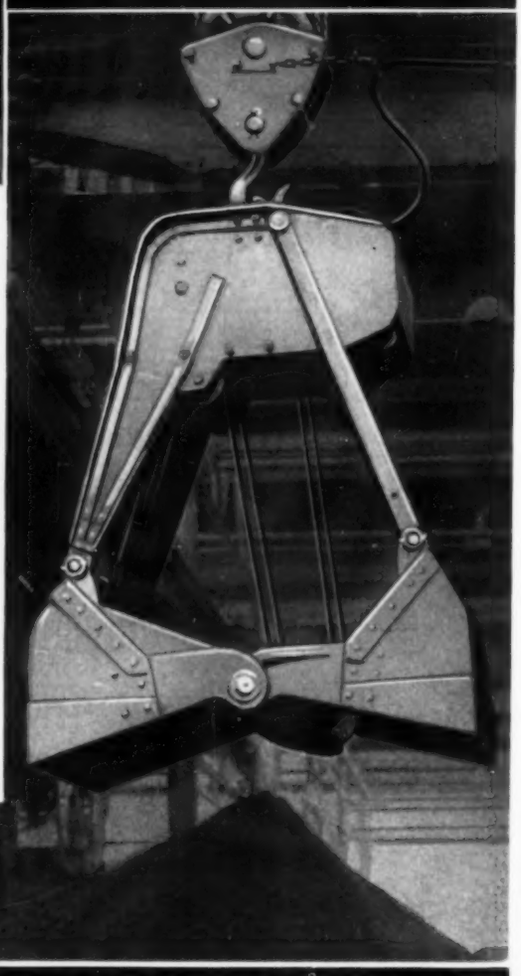
The 4 major metal divisions—steel, malleable, gray iron and nonferrous castings—are sponsoring sessions with a large number of papers on various important records and metallugical problems. The steel division will hold 4 technical sessions and a roundtable luncheon. The malleable division will hold 3 sessions and a round-table luncheon. The gray iron division will hold 4 technical sessions and the non-ferrous division will hold 2 technical sessions, a roundtable luncheon and its annual dinner. Detailed information on the complete program will be found on pages 106 and 107 in this issue.

Coal Tar Pitch

Reilly Tar & Chemical Corp., Indianapolis, Ind., has placed on the market a hard coal tar pitch claimed to be an effective extinguisher agent for magnesium fires and magnesium incendiary bombs. Developed at the Central Experimental Station of the Bureau of Mines, U. S. Department of the Interior, Pittsburgh, the coal tar pitch, with approximately 300 degrees Fahr. softening point when spread over a magnesium fire, softens and seals the fire with an air tight blanket. The material is available through 17 plants in industrial sections.



STRAYER ELECTRIC



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ERIE BUCKETS

10 TYPES TO MEET ANY BUCKET WORK

WISCONSIN HOLDS REGIONAL

(*Concluded from page* 164)

stitute, Columbus, O., as leader. In a session on malleable cast iron W. D. MacMillan, International Harvester Co., Chicago, spoke on factors affecting rate and cost of annealing. L. D. Harkrider, General Malleable Corp., Waukesha, Wis., acted as chairman of the meeting. According to Mr. MacMillan most important factors are composition, rate of heating, method of heating, and furnace atmosphere. Attention was directed to the possibility of melting practice and history of raw materials causing difficulty in annealing. Instances of both were cited to bear out that contention. Higher than regular range of manganese content was said to have little effect on first stage annealing, and in some cases seems to aid. However, increased manganese retards the second stage of annealing.

Final session on steel castings was under the direction of David Zuege, Sivyer Steel Casting Co., Milwaukee, and the speaker was F. A. Melmoth, Detroit Steel Casting Co., Detroit. Mr. Melmoth discussed "The Metallurgist and the Steel Foundry," and pointed out how the metallurgist aided in advancing the industry, and stated that vast fields still lie before the metallurgist offering opportunity of product improvement. Many factors are not thoroughly under control because they are not understood completely. With new tools and instruments available some of those may be solved.

Closing session on nonferrous foundry practice was devoted to a discussion of gates and risers by A. J. Busch, Chas. C. Kawin Co., Chicago, with A. K. Higgins, Allis-Chalmers Mfg. Co. in the chair.

Concluding meeting of the conference was a joint meeting held at 3:30 p.m. It was conducted by Chairman George Dreher, Ampco Metals Inc., Milwaukee, and brief talks were given by army officers and one civilian inspector on phases of ordnance work. Lt. Col. Barrett Rogers said that more and more cast steel shell would be made. Bomb casings also would be made of cast steel. He also mentioned that while open hearth and electric furnaces were the standard melting units for cast steel for ordnance work, bessemer steel had been authorized for certain purposes.

Capt. Fred D. Hansen spoke on the functions of the Milwaukee office of the Ordnance division while Lt. A. L. Spurlock mentioned that the tank program was moving along smoothly, and before long some real production would take place. Leonard Quick, chief inspector for the Milwaukee district, gave a brief talk on ordnance inspection methods.

Proceedings of the sixth annual forum of the Porcelain Enamel Institute have been published. Copies may be obtained from the Porcelain Enamel Institute, 612 North Michigan avenue, Chicago, for $2.

Safety Spectacle

Tulca Division, The Univis Lens Co., Dayton, O., is marketing a new type rimless safety spectacle with or without side shields for men and women engaged in industrial occupations. These new type lenses made of a special new material weigh only half as much as glass lenses. In the safety field this light weight factor is regarded favorably because it removes the tendency to remove the goggles during the day and thus offers continual eye protection while the wearer is engaged in his or her work.

8 out of every 10 TRANSITE CORE PLATES are bought by steady, long-time users . . .

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Committee Proposes Specifications

Among the important actions recommended at the meeting of Committee A-7 on Malleable-Iron Castings held in Cleveland during A.S.T.M. committee week, March 2 to 6, 1942, was the decision to send to letter ballot of the entire committee proposed specifications covering malleable-iron castings for flanges, pipe fittings and valve parts. This is the first in a series of specifications that are expected to cover specific applications of the material. Although the requirements have not yet been approved by the standing committee, the draft indicates that castings are to be free from primary graphite and are to be given an annealing heat treatment to produce a blackheart structure. In the section on physical properties it is indicated that although malleable irons of higher physical properties are made the properties set up are the basis for the design, proportions, and pressure ratings. Tensile strength is to be 40,000 pounds per square inch minimum; yield point, 30,000 pounds per square inch minimum; and elongation in 2 inch, 5.0 per cent minimum. Details of test specimens, workmanship and finish, and marking are given.

Decision to submit to the American Standards Association for approval two of the committee's specifications covering Malleable Iron Castings (A47-33) and Cupola Malleable Iron (A197-39) is a recognition of the widespread use and authoritativeness of these two standards which have been effective in A.S.T.M. for a number of years. In fact, the requirements in A 47 have remained unchanged since 1933, but in line with recognized society procedure the committee reaffirmed the up-to-dateness of the specifications and will include when they are next printed in the 1942 *Book of Standards* a note that they are in line with current practice.

There is continued interest in pearlitic malleable irons and suggestions on classifying these materials are to be referred to producers for comment.

While there was a great deal of discussion concerning the status of specifications for various kinds of ferro alloys, the only specific action taken by A.S.T.M. Committee A-9 on Ferroalloys was to recommend the adoption as standard of Specifications for Ferrochromium (A101-39T), which has remained unchanged since 1939.

Castings on the move

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Use the following to shorten long jobs and eliminate unnecessary ones.

LION BINDER - A strong, fast drying paste; tie wires not needed. A strong binder that bakes very fast.

EASY CLEANER CORE COMPOUND - Makes cores that clean out of the castings readily.

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DUST-ON FACING - Shake it on green sand molds, close and pour. No tooling. Fast cleaning.

SUPERIOR PLUMBAGO - Rubs in immediately; doesn't "lift" the sand - - peels beautifully.

SILKOTE - Paint or spray on steel foundry cores, dry sand molds and skin dried work. Adaptable to fast application. Casting surfaces are really clean.

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FOUNDRY FACINGS • SUPPLIES • EQUIPMENT

Prepares Report on Plant Protection

At the request of the government through the Office of Civilian Defense, the Industrial Hygiene Codes Committee of the American Foundrymen's Association under the chairmanship of J. R. Allan, International Harvester Co., Chicago, has written the "Code of Recommended Practices for the Protection of Life, Property and Production in the Foundry Industry during War."

In preparing these rules the committee has kept in mind the effectiveness of the recommendation; the minimum cost to accomplish the desired results and the minimum time required to prepare for the protection and defense of the property. The code covers a broad field running into ten sections. To describe it briefly, the first five sections set forth the scope, purpose, hazards to be guarded against and unending vigilance that must be exercised at all times during the war.

Section VI covers plant organization for emergencies from management's duty, protective organization for emergencies, investigation of plant personnel, identification of employes, plant visitors, and groups responsible to the co-ordinator. Section VII deals with buildings and

properties, existing plants, new buildings and properties, fencing, gates and entrances, window guarding, trees, brush and materials, lighting at gates and entrances, lighting along property lines and strategic areas, protection of strategic installations, utilities serving the plant, air compressor intakes and exterior fire escapes and building ladders.

Section VIII outlines protection required for black-outs and bomb raids, methods of blacking out wall and roof openings, light tightness of buildings and structures, light locks for doorways, blacking out fire and glare from metallurgical and other process operations, emergency interior lighting, exterior lighting, outside signal lights, luminous marker materials, black light, electric power and light circuits, smoke screens for hiding purposes, hazards of black-outs, vehicles operating within plants, flash-lights and outside fires. Section IX is devoted to miscellaneous recommendations such as safeguarding of valuable records, advertising signs, sand bags for protective purposes and items of general importance. Section X covers camouflage, its use and methods.

Adventures of Bill

(*Concluded from page* 154)

about half way up on one side. Any of these gates and risers should function satisfactorily.

"From the evidence submitted we are inclined to the opinion that the sand or the molding method, or possibly both is or are responsible. If the sand is too tight, or too wet or rammed too hard, the metal will not lie quietly, but will kick and boil with consequent production of a slushy compound of sand and iron. A possibility exists that the long gates are not made properly with the result that sand is washed into the mold. He can decide this point by pouring a casting without a cope and noting the behavior of the metal as it rises in the mold.

"With this feature remedied to his satisfaction, two alternative methods of pouring the casting are available. Choice will depend to some extent on whether he is in position to machine the top, or if the customer wants the slug in the as cast condition. In the first instance the metal is poured directly into an open mold about 1-inch longer than the casting. The mold is filled to the top and then covered with blacking, charcoal or dry sand. In the second method the mold is covered with a dry sand core. A semispherical hollow in the upper side of the core is connected to the mold by a small opening about 1-inch in diameter in the center. The mold is filled through an ordinary small gate at one side of the top. Pouring stops when the metal touches the core. The basin then is filled with fresh metal from another ladle. The filled basin is covered with any kind of insulating material. This is the method practiced in a prominent midwest foundry. If the number of castings is sufficient to warrant the expense, he might set up a battery of iron molds in which the slugs can be cast repeatedly after the manner of ingots."

Publishes Booklet On War Work

Copper & Brass Research Association, 420 Lexington avenue, New York, has published an illustrated booklet "How Small Industries Can Go After War Work." Information is given on methods of obtaining contracts or subcontracts through the Contract Distribution Branch, Production Division, War Production Board, Washington, or through regional offices of the WPB in many cities and states maintained for that specific purpose.

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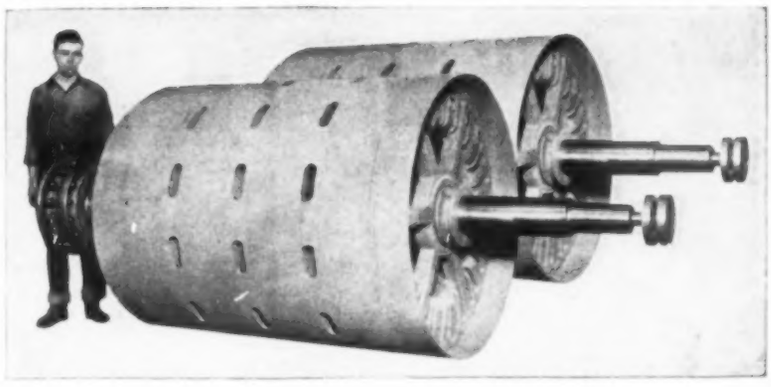

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BIRMINGHAM STAGES CONFERENCE

(*Continued from page* 157)

most basic of all industries, both in peace and war, and that without foundries there could be no production of machine tools, tanks, airplanes, ships, guns and a wide variety of other products of industrial production so essential to war.

Mr. Kennedy stressed the importance of obtaining maximum efficiency from the equipment available, and discussed in some detail improvements which have been made in various types of equipment including that employed in the core room, for mechanical charging, for preparation of sand, etc. He discussed the rapid growth of aluminum and magnesium foundries and indicated in some detail the part of the other branches of the industry in the war production. Mr. Kennedy spoke on conservation and salvage, the work of A.F.A. committees in connection with plant protection, etc., and the efforts that are being made to meet the important needs for trained men.

A special entertainment program on Thursday evening featured a showing of the motion pictures taken at the Cotton Bowl game in January. Friday morning was devoted entirely to plant visitation. The first technical session Friday afternoon was held under the chairmanship of T. G. Johnson, Republic Steel Corp., Cleveland. The session featured an interesting discussion "Recent Developments in Desulphurizing Cast Iron" presented by George S. Evans, metallurgist, Mathieson Alkali Works, New York. After tracing the early uses of alkali for desulphurizing and refining molten cast iron the speaker considered the use of desulphurizing practice in connection with blast furnace operation.

Mr. Evans pointed out that another development in rapid metallurgy, making use both of desulphurizing and dephosphorizing by ladle treatment, includes cupola-converter-electric furnace triplexing. It was stated that this system offers the means of more than doubling the output of electric furnace units within a minimum of time and expense for building any equipment. The speaker also stated that with the development of desulphurizing in advances of the cupola melting practice, it now is possible to use an all scrap steel and ferrosilicon charge in the cupola and produce uniformly high quality steel castings by the converter process with sulphur contents well under 0.05 per cent.

Refine with Soda Ash

Development of the u-shape mixer refining ladle with cover and insulation, it was pointed out, has served to extend refining with soda ash in the gray iron industry to an increasing number of foundries during recent years. The speaker indicated that this type of ladle is not adapted to maximum per cent desulphurization but is particularly effective as a mixer refining ladle, and by providing a continuous supply of refined metal is well suited to production foundries where, for best results, the extent of sulphur reduction is usually limited to some 25 to 40 per cent. In closing Mr. Evans stated that the most important factor in efficient desulphurizing, with the exception of temperature, are as follows: Clean metals free of slag or any siliceous impurities and rapid intimate contact between the metal and the soda slag.

The second technical session of the afternoon featured talking movies presented by Ira R. Wagner, vice president, Electric Steel Castings Co., Indianapolis. One dealt

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with the designing of steel castings and is the presentation arranged by the Steel Foundry Society of America. The other, a technicolor movie "Steel Foundry Practice" consisted of excellent photographs taken by Mr. Wagner in the Electric Steel Castings Co., Indianapolis, and presents a most interesting picture of the practices and processes involved in the production of steel castings. While this film was prepared for non foundry groups, it proved of great interest to the foundrymen who attended.

The final session was the annual banquet at which J. A. Bowers presided and W. Carson Adams was the toastmaster. The guest speaker was Dr. John Temple Graves of Birmingham who talked on "Not Made to Die".

Awards Recognize Contributions

(*Concluded from page* 125)

prenticeship at the plant of I. Matheson & Co., New Glasgow. At the conclusion of his apprenticeship he took a post graduate traveling course of 5 years through prominent foundries in Canada and the United States to round out his knowledge of foundry practice.

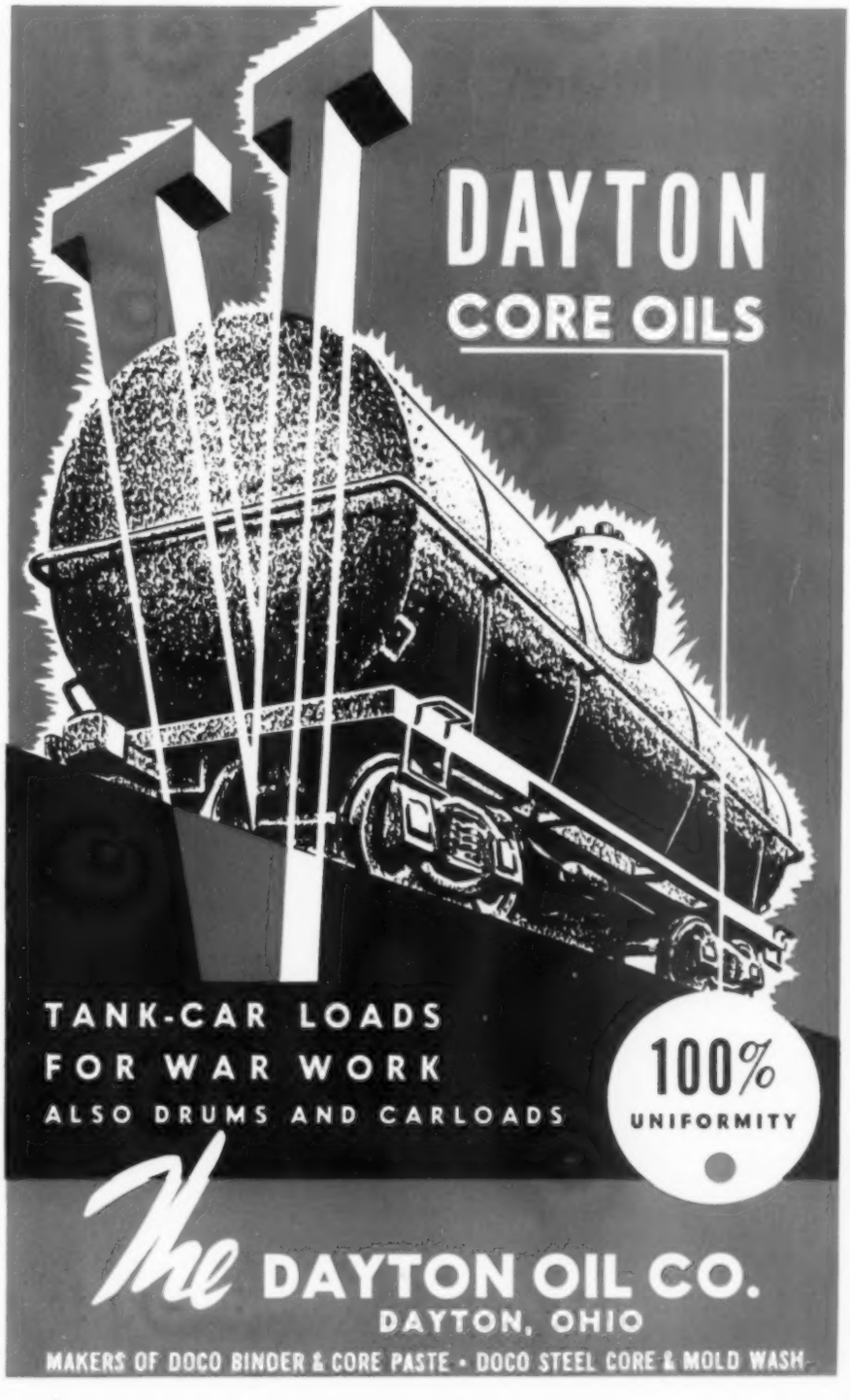
Returning to Nova Scotia he served as foreman of the iron, brass and steel foundries of the Dominion Iron & Steel Co., Sydney, for 9 years and later as superintendent of the Sydney Foundry & Machine Works, for a like period. Ever a diligent student of his chosen vocation, he studied mechanical drawing at night school while an apprentice. In later years he availed himself of the foundry course of the International Correspondence Schools, Scranton, Pa., and the correspondence course developed by David McLain, Milwaukee.

His extended practical experience coupled with wide reading, a gifted taste and a remarkable memory conferred authority, culture and polish readily apparent in his writings. His scholarly and lyrical prose delineation of the "Adventures of Bill", extending over a period of 23 years, and illuminated by flashes of wit, humor, philosophy, sustained reader interest and occasional biting criticism of stuffed shirts and other examples of hypocrisy, has set a record never even remotely approached by any technical magazine. In addition to this and a long list of technical articles dealing with practically every phase of foundry practice, he is the author of *Gates and Risers for Castings*, a detailed and comprehensive treatise on this important subject, now going into the second edition. Equally gifted as a speaker and writer, Mr. Dwyer has delivered addresses before every foundry group from the Atlantic to the Pacific.

International Acetylene Association, 30 East 42nd street, New York, recently has published a new book designed to assist instructors in planning courses for the training of oxy-acetylene welding and cutting operators. The book is entitled "Training Oxy-Acetylene Welding and Cutting Operators—Instructors Outlines" and may be obtained through the association for 25 cents per copy.

A.S.T.M. Publishes Standards Index

The American Society for Testing Materials, 260 South Broad street, Philadelphia, recently published its yearly index to its standards and tentative standards. The index containing 173 pages lists under a subject index 685 standards and 358 tentative standards, and the page location of each in the 1939 *Book of Standards* and the 1940 and 1941 supplements to that volume published by the society. Copies may be secured from the society.



TITANIUM DEOXIDIZED STEELS

(*Continued from page* 136)

though there might be some segregation and some suggestions of streaky or network arrangements on a comparatively coarse scale.

The special deoxidation, sulphide distribution gradings, and remarks indicating deviations from the normal practice for our laboratory work, are reported in the accompanying table.

The only unsound casting used in this work was No. 49, which is included in the table to illustrate the effect of over-oxidation of the steel bath. It was planned to pour this heat at as low a temperature as possible, but after the deoxidizers were added it started to solidify in the furnace before it could be poured. It took about 20 minutes to melt the skull formed, and during this time the steel was exposed to the air, forming considerable oxide at the surface. The unsoundness of the casting shows that all effect of the aluminum and titanium deoxidation was lost, and the inclusions found in this casting were typical of untreated steel.

The table shows how the sulphide distribution was satisfactory in untreated steel, and also in steel treated with 2 to 3 pounds of aluminum per ton. With no aluminum, 7 to 10 pounds of ferro carbon-titanium per ton gave poor results, but with 1 pound of aluminum (giving poor results by itself) these amounts of ferro carbon-titanium gave the same improvement as increasing the aluminum addition.

With ½-pound of aluminum per ton the results were inconsistent, this addition apparently being on the border line between the very small permissible amounts and the amounts giving poor sulphide arrangement. Even 10 pounds of ferro carbon-titanium was not quite enough to bring the sulphide arrangement back to a satisfactory condition, with only ½-pound of aluminum per ton.

Relations Presented Graphically

These relations are presented graphically in Fig. 5, where the amounts of aluminum and ferro carbon-titanium to be avoided are clearly outlined. All the results are plotted on Fig. 5 except those from heat 49, which as has been explained was so abnormal that the inclusion of its results with the others would be more misleading than helpful. Assuming that some aluminum must be used to prevent pin-hole porosity in steel cast in green sand, this diagram illustrates the fact that satisfactory sulphide distribution can be secured with only one pound of aluminum per ton instead of two or more, provided about 7 to 10 pounds of ferro carbon-titanium are used with it.

It should be emphasized that these results apply accurately only to the steel composition and melting conditions used for our castings. The experience with heat 49, described previously, shows that with more highly oxidized steel the range of deoxidizing additions to be avoided would shift upward and to the right in Fig. 5. Also with less oxidation in melting than by our normal practice, this range might shift in the opposite direction. Thus the minimum amount of ferro carbon-titanium required for good sulphide distribution with one pound or less of aluminum per ton might vary in different foundries according to the melting practice.

Hence, Fig. 5 could be used in any specific instance merely as a guide for the first trial, subject to later modification. Considerable experience with other heats, duplicating the results in the table, indicates

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that the pouring temperature, at least between 2770 and 3000 degrees Fahr., is not an important factor in this work, but the state of oxidation of the steel is evidently very important, and the carbon and alloy contents may also have some effect.

It might be expected that generally, to obtain the same results in regard to sulphide distribution as with 2 to 3 pounds aluminum per ton, about 1 pound aluminum and 6 or 7 pounds ferro carbon-titanium per ton should be satisfactory. With only ½ pound aluminum, more than 10 pounds ferro carbon-titanium would probably be required per ton. Past experience in many foundries has shown that good results in sulphide distribution are also obtained with no aluminum and about 4 pounds ferro carbon-titanium per ton, but this practice does not always provide definite assurance against slight pin-hole porosity when green sand is used.

Sulphide Inclusion Important

Tensile tests were made on many of the castings listed in the table, using specimens of standard size and shape, cut from the bottom layer of the casting and normalized at 1650 degrees Fahr. The results showed that the ductility corresponded very well with the sulphide arrangement in the steel. All castings graded good or fair according to the sulphide arrangement showed over 19.5 per cent elongation and averaged 21.5 per cent, while all those graded poor or bad showed less than 19.5 per cent elongation with an average of 15.1 per cent. This merely supports the fact, already well established, that the ductility of ordinary cast steel is very largely dependent on the distribution of the sulphide inclusions.

In conclusion, these tests have shown that with only ½-pound or less of aluminum added per ton in cast steel, melted by our basic induction process in air with practically no slag, ferro carbon-titanium additions between about 4 and about 10 pounds per ton should be avoided, if an inferior arrangement of the sulphide inclusions, giving poor ductility, is not desired. If the steel is oxidized more in melting than by our practice, the range of ferro carbon-titanium additions which must be avoided to obtain good sulphide distribution and ductility is raised; and if oxidized less, the range is correspondingly lower. Definite values thus depend on the melting practice and cannot be rigidly fixed for every foundry without some preliminary trials.

With more than ½-pound of aluminum per ton, the limits of the ferro-carbon-titanium additions to be avoided are much lower, as has been noted. Satisfactory sulphide distribution and ductility should probably be obtainable, with average steel-foundry melting practice, using either no aluminum and about 3 or 4 pounds ferro carbon-titanium per ton, which, however, does not always insure against pin-hole porosity with green-sand molding practice; or 1 pound aluminum and about 7 pounds ferro carbon-titanium per ton, which saves at least half the high aluminum addition often used in cast steel, while retaining enough to afford protection against pin-hole porosity, and also giving satisfactory physical properties.

Acknowledgments:—

The experiments described in this article were conducted in the metallurgical research laboratory of the Titanium Alloy Mfg. Co. Thanks of the author are due to the company for providing the facilities required for the work, and for permission to publish the results. The effective help of A. S. Yocco and H. R. Spendelow, Jr. in making the tests also is acknowledged gratefully.

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LET'S TAKE A LOOK AT SPECIFICATIONS

(*Continued from page* 133)

Incidentally, consumer confidence will be increased and disputes and arguments minimized by realistic approach.

3. Use of integrally cast coupons and of coupons cast in the same gating system in general should be discouraged. This advice is not an attempt to prevent the customer from knowing the properties of the metal in the castings. If cast on coupons or coupons gated to the castings did serve their ostensible purpose, their use would be justified and should be promoted, not discouraged. However, it usually works out in practice that the casting suffers in an effort to get a good coupon, and vice-versa. Thus, the consumer who insists on having a cast-on-coupon often is defeating his real purpose, namely that of assuring the production of a good casting.

This is not an absolute or universal rule and in a few cases a good coupon and casting can be made simultaneously in the same system. Before specifications for a specific cast article are drafted, including provisions for a cast on or integral bar or one cast in the same gating system with the casting, careful study should be made, and it should be established by test that the two objectives can be reached. Certainly it should not be the privilege of an inspector to rule on this practice as some specifications permit. Also, it is not possible to draft general specifications, covering a wide variety of cast articles, and provide properly for cast on and/or integral coupons.

Why not take a test piece from the casting? At first glance this seems a logical procedure. In practice it usually does not work out satisfactorily. More often than not the shape of the casting or its size does not permit this practice. Even when size and shape permit, questions of orientation of "grain" usually are encountered. Forging advocates frequently point with pride to excellent ductility values obtained from test specimens from their product.

Parallel To Flow Line

On examination it usually is seen that such specimens have been taken in such a way that the applied test stresses are parallel to the flow line. More often than not the stresses in service act normal to (at right angles to) the flow lines. Many tests have shown that the properties, particularly ductility, differ greatly, according to the direction of the applied stress. It is not unusual to find examples in forged and wrought materials where ductility "across the grain" may be 10 per cent or less than found "along the grain".

Careful study of trepanning methods, widely advocated by the French some years back, have been made by a number of investigators. The general conclusion has been reached that the methods as advocated, and including the shear test, are decidedly unreliable.

There are cases where it is practical and proper to attach coupons onto some sections, and some cases where it is possible to cut test pieces out of castings. It is impossible to prescribe in general specifications a set of sound rules to follow. By and large such spread tests should be matters of agreement between producer and consumer. The test values to apply should not be selected from some general specification, but through the study of results of many tests which were conducted as contemplated. In case of some cast alloy steels, for example certain 5 per cent chrome

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steels, ductility values appreciably lower than usual on separate coupons can and should be expected.

Certain types of "service" and related tests are conducted on finished or semifinished castings, as for example hydraulic pressure tests on pressure containing vessels, drop tests on car wheels, deflection or breaking tests on pipe, and the like. Such tests are quite useful adjuncts to tests on properties of the material itself.

American foundrymen should as individuals and their associations such as the A.F.A. and A.S.T.M. oppose general specifications which prescribe cast-on coupons, samples from castings, and similar procedures. Such opposition should be most emphatic when the option is left wholly to a consumer's representative, or when the specification is couched in ambiguous terms. What is needed is streamlined speed and efficiency, not cumbersome red tape, bickering and delay. When a particular usage makes some specialized test desirable, a specification (mutually agreed on by consumer and producer) should be devised to cover that particular case, and that case only.

4. In all matters involving test methods the simplest, most economical and most consistent procedures should be insisted upon. The objectives and design of test coupon should be the same as that in design of a casting, namely securing a sound, dense structure with maximum ease and economy. To illustrate the point, consider the type test bar in A.S.T.M. specifications B-60, B-61, and B-62 for bronzes and red brasses. This is shown as Fig. 3, and is reproduced from page 160, A.S.T.M. Standards, 1941 Supplement. This bar is similar in principle to Fig 10 and 10A General Specifications for Inspection of Material Appendix II, Navy Department, shown here as Fig. 2 and 4.

Use Best Practice

It is quite evident to foundrymen that the method giving the strongest and most uniform metal under the same melting, pouring and sand conditions is that which conforms to best foundry practice. Also it is obvious that the large risers above the bars are intended to feed these bars and to produce strong dense metal. Otherwise why require expensive hand molding, and the expense of sawing off the riser, and of trimming a bar far from round at the start? Money is spent for a hoped objective. Is the objective realized?

In contrast, consider a considerably less expensive bar, which is much easier to mold, has no overall riser to be cut off, can be machined to 0.505-inch diameter (if desired) more readily. Such a bar is shown in Fig. 1. If this bar gives equally good test results and produces no greater variation, then economy indicates that it is to be preferred to bars such as those shown in Figs. 2, 3 and 4.

A series of tests were made using A.S.T.M. B-61 alloy (Navy M) poured within the range of 2150 to 2190 degrees Fahr. Three test bars were poured from a ladle, two the LTB-1 design shown in Fig. 1, one the A.S.T.M. design shown in Fig. 3. The same sand was used for all molds. As shown in Fig. 5 and 6, some 26 sets of comparative tests were made. This series of tests showed beyond question that the LTB-1 design produces a denser, sounder bar and that the results from test to test are more uniform.

The A.S.T.M. and Navy specifications make a bar machined to 0.505-inch diameter mandatory. In Federal specifications, QQ-B-691a (which includes B-61 as composition No. 1) it states "F-3d-Test specimens may be of two types, namely machined or cast-to-size. F-3C, unless otherwise specified, machined test specimens shall be used." Why not a prescribed unmachined or cast-to-size bar? A careful search of the literature reveals that little worth-

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while study has been made on test bars for bronzes of these and related types. The product of the foundry is measured by these bars.

Mr. Foundryman, you undoubtedly recognize that the time of producing the latter bar is much less, and the results reveal better the potential qualities of the metal. But just what support have you, as an individual, given to the A.S.T.M., and the A.F.A. and other groups? What real interest have you shown? Multiply the time lost on one fancy bar by many bars, for it is just leaks and wastes here and there that, in the aggregate, mean much loss in the war effort? Too many are willing to let George do it. But if George doesn't do it just right, at least he has tried and those who did not participate haven't any room to even whisper about it. If you haven't taken an active part in specification formulation and conducted or at least supported studies and researches, whose fault is it? Why not take an aggressive part in specification development? Assuredly a great deal more work is needed.

Consider an other case, prescriptions for cast iron tests and test bars. During the past 20 years, and especially during the past 10, there has been much practical development in the quality and uniformity of cast iron. Such developments mean little to the designing engineer unless he can prescribe the mechanical qualities needed in various section. The only real way he can do that is through proper specifications. In spite of any propaganda to the contrary, chemical composition alone does not wholly determine the mechanical properties of the metal. When castings are obtained from several sources, a composition that might result in satisfactory iron from one foundry may be not satisfactory if obtained from another. It is wishful thinking to hope that by some alloy addition all is made easy and that good results are assured. Alloys have their place, a useful place, but compositions including alloys have but a minor place in most iron specifications.

Some years ago all iron specifications prescribed an "arbitration" bar to indicate the "quality of iron in the ladle." Isn't the customer somewhat more interested in the quality of iron in the castings themselves?

While all metals vary somewhat in strength, according to the sections into which they are poured, cast iron may vary greatly. One can find irons which chill white, are brittle, unmachinable and useless when cast into very light sections. The same iron, when cast into very heavy sections (say 6 or 8 inches) may be very coarse grained, soft, weak, and unsuited for any but least demands of engineering services. It is true that metallurgists have developed irons—usually quite low in total carbon—which have a considerable degree of quasi-isotropy, but even these may run from say 55,000 pounds per square inch tensile in lighter sections down to 35,000 pounds per square inch tensile in very heavy sections.

The only practical way for a consumer to assure himself that the iron which he purchases is capable of possessing desired mechanical properties in the desired size sections is to prescribe a size of test bar which bears some relationship to the size of sections to be produced. This is possible in certain American specifications, such as A48-41 of the A.S.T.M., and in Federal specification QQ-I-652. These specifications give three diameters of bars, as cast, to be used according to controlling sections of castings as follows:

Thickness of Controlling Section, Inches	Diameter of Test Bar As Cast, Inches
0.50 or less	0.875
0.51 to 1.00	1.20
1.01 to 2.00*	2.00

*It is interesting to note the unity of set up under the British Standards Association, Technical Committee IS/35, Cast Iron, under chairmanship of J. G. Pearce

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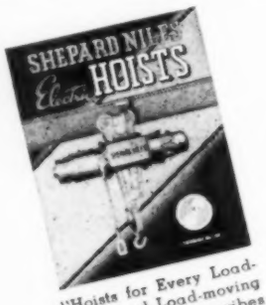

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of the British Cast Iron Research Association. Among those represented are: Admiralty, Board of Trade, War Office, British Chemical and Plant Manufacturers Association, Institute of Automobile Engineers, Institute of Mechanical Engineers, Institute of British Foundrymen, Iron and Steel Institute, Lloyds Register, etc., etc. There apparently is one set of master specifications to cover all fields where cast iron is used, and all the major agencies are parties to the specification. The British Cast Iron Research Association carries out most of the studies (as do the A.S.T.M. and to some extent the A.F.A. here).

For sections over 2 inches a larger test bar may be used by agreement between consumer and producer. However, in test bars above 2 inches in diameter as cast there usually is not a great drop off in strength, as compared to the 2-inch bar. The greatest sensitivity, or change in strength with change in bar diameter, nearly always occurs within the range of bar sizes shown. The British have gone somewhat further and prescribe some five bar sizes as follows: 0.600; 0.875; 1.20; 1.60 and 2.10 inches diameter.

Extensive studies show that by use of specifications such as A.S.T.M. A48-41 and QQ-I-652, real engineering selection and specifications can be effected. A wide range of tensile strengths and optional transverse test loads are available.

There are other specifications which give different tensile grades for the same size single bar, and indicate directly or otherwise that the stronger irons will give suitable results in large sections. Much wishful thinking is involved here. It is a simple and easily demonstrated fact that with two irons of same strength, for example 35,000 pounds per square inch in a 1.2 inch diameter bar, there may be very considerable differences if these irons are cast into heavier sections, such as 2.00 inch diameter bars or larger.

Some foundrymen feel that specifications such as A.S.T.M. A48-41 and QQ-I-652 are too complex, etc., and like to stick to the "good old days" and the "arbitration" bar. We have even heard it said that a 2.0-inch bar is too big to test, etc. Such attitudes may be all right for those making sash weights, but certainly are out of date for foundrymen trying to sell an up to date engineering material.

The foundryman should work toward master specifications for cast iron products, specifications that enable intelligent safe selection in the first place, and insurance of definite standards of quality in the second.

There are many poor specifications for cast iron extant in this country. Simply because it happens to lie before us, let us look at Navy 46-I-6b, as one of many typically unsound specifications. This calls for the following:

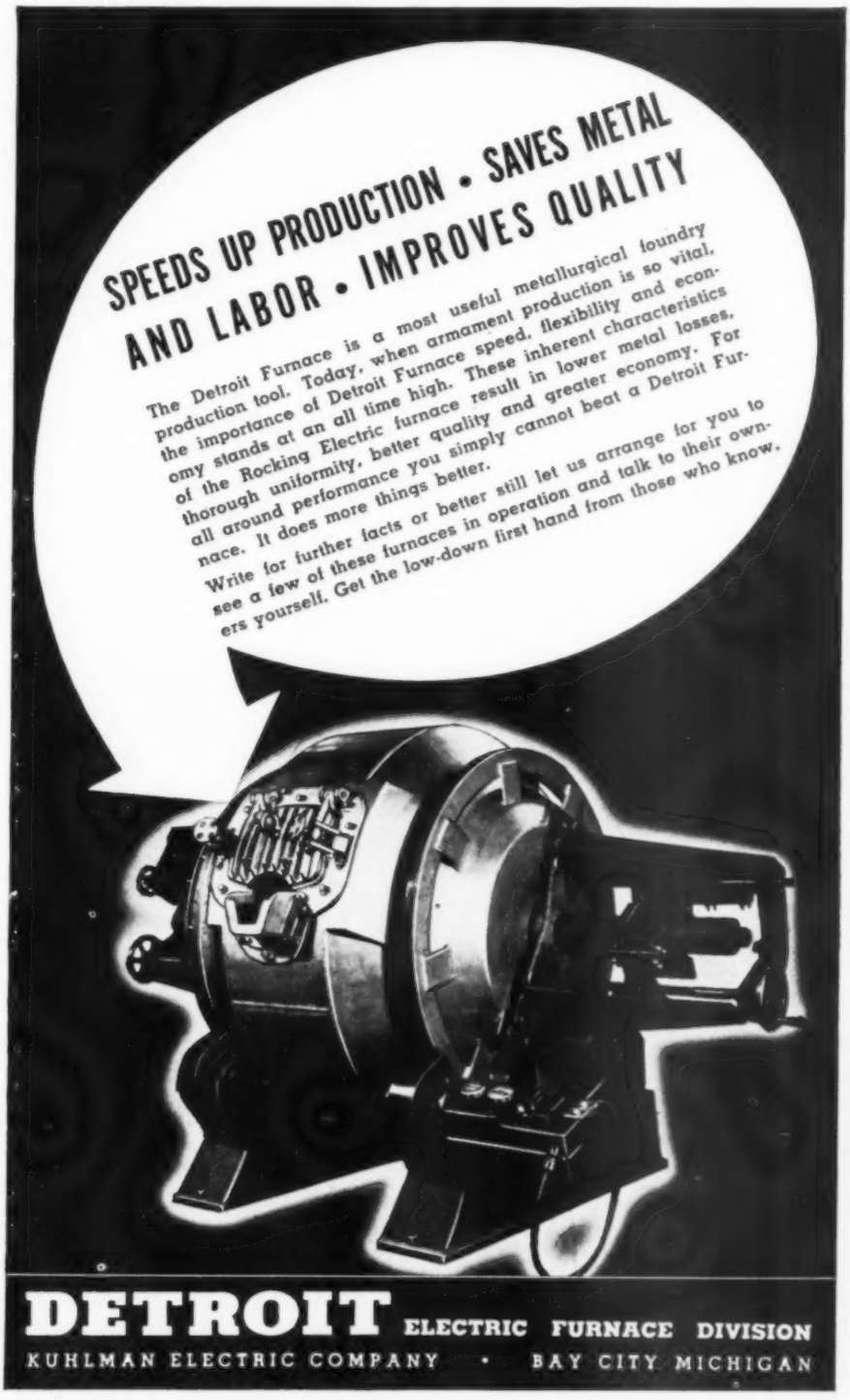
Light castings (less than 1.0 inch) 18,000 pounds per square inch tensile (1.20-inch diameter).

Medium castings (0.5 to 2.0 inches) 21,000 pounds per square inch tensile (1.20-inch diameter.)

Heavy castings (no section less than 2.0 inches) 24,000 pounds per square inch (1.20-inch diameter).

Candidly, it hardly is possible to make such poor material as 18,000 pounds per square inch tensile in a 1.2-inch bar. It is possible to make material suitable for high speed production machining in light castings to minima well over 21,000 pounds per square inch with the greatest of ease, averaging 26,000 to 30,000 pounds per square inch. We shudder to think as to what material running at a minimum of 24,000 pounds per square inch in a 1.20 diameter bar is like in sections 2.0 inches and over. Such materials are hardly suitable where stress is a factor of any moment.

Navy specification 46-I-5c provides for higher strength classes up to 45,000 pounds per square inch. There is no direct provision for section size selection, as in QQ-652 for example. It contains prescriptions for phosphorus content that appear to be unduly restrictive. The old bugbear of tensile test specimens attached to castings appears. Amazingly, the effect of section, defined in measurable terms, is ignored entirely.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Why should there not be antipathy toward the use of cast iron when there is no sound basis for section of good and proper classes?

Yet today, in order to conserve other metals and other melting media, and to promote greatest speed in the war effort, it behooves all concerned to use cast iron as extensively as is safe and proper. Good strong uniform cast iron has a lot of toughness—although it is not truly ductile—and it can and should be used.

What are you doing, Mr. Foundryman, to promote soundly the usage of cast iron in many places? What support will you give to promotion of master specifications which will enable intelligent selection of cast iron. It's not only your affair, it's an affair of your country—a step toward speed and efficiency. We pride ourselves on American manufacturing efficiency. Materials selection and prescription are steps in the manufacturing cycle. There are a number of overlaping and conflicting cast iron specifications—some of them unsound from metallurgical and engineering viewpoints. Support is needed to clear up this situation.

In the cast steel field, let's talk about some things aside from test bars. Just a few years ago steel foundrymen were concerned over the inroads being made by welded structures. A scattered few quit moaning and investigated the possibilities in welding cast steels—not repair welds but structural welds. Sure, cast steel can be welded and safely Welding is an adjunct to the art of steel casting. Much more remains to be learned to utilize the welding art to greatest extent What proportion of the steel founders are studying the possibilities of structural welding and how many are supporting researches?

How many give really close attention to all the ramifications of steel castings specifications? Why, for years, did some specifications limit some simple steels to 0.50 per cent maximum silicon when no clear cut data were brought forth to show that 0.60 or 0.70 per cent were in any way harmful? Why, for instance, did a proposed specification, subsequently revised, attempt to limit the temperature of insertions into the heat treating furnace to 200 degrees Fahr. or 300 degrees Fahr.?

Require Substantiating Data

No smart foundryman wants latitude to do things that might be inimical to the quality of his product. Yet, when something that appears unreasonably restrictive is promulgated, why not oppose it actively and openly? When something that looks unsound is proposed, is it not up to the foundryman to ask for data to substantiate restrictive proposals? For example, consider that tests show cracks result when certain types of castings are thrust into a furnace at 900 degrees Fahr. Further tests, let us say, show no cracking at 700 degrees Fahr. Perhaps to play safe 600 degrees Fahr. is finally chosen.

But (in our assumed case) one could lean over backward and maintain that the furnace should be cooled to room temperature before loading. Hypothetically this might be ideal, but the time to cool from 600 to 300 degrees Fahr is much longer than from 900 to 600 degrees Fahr., and cooling below 300 degrees Fahr. to room temperature is a matter of many hours. Thus production is restricted greatly to get an hypothetically ideal condition. The same steel may be heated up to say 1600 degrees Fahr. and normalized (air quenched). Aren't the thermal gradients and internal stresses resulting therefore likely to greatly exceed these brought about when introducing a "cold" charge into a furnace at 400 degrees Fahr. or 500 degrees Fahr. or 600 degrees Fahr.?

In the foregoing the author has referred briefly to a few among

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many things that today hamper certain aspects of the war effort. It is a fact that there are too many specifications and far too little co-ordination and correlation among them. Not a few are confining, ambiguous, and conflicting. In some cases testing procedures are far from ideal. Some are restrictive without sound reason. Others do not promote intelligent selection and prescription or materials. Examples chosen do not represent the worst.

Sound streamlined specifications can be very helpful in this war—both toward making sure that the material is suitable for the service, and toward expediting its selection, manufacture, and approval. Foundrymen in general have not always exhibited a very constructive attitude toward specifications—many regard them as necessary evils. This is quite wrong. A constructive attitude is needed with complete cooperation in obtaining the objectives desired. Too often in specifications at large one sees jockeying for position, lethargy toward factual approach, little or no support from research, an insistence upon pet theories or opinion or little inclination toward gathering experimental data. Mind you, this does not apply alone to cast products. The author has seen some perfectly ludicrous attempts to prescribe and rate some wrought products. All sound specifications must rest on facts, on research, on practical experience.

Bias Is Tempered

Of the very large number of agencies developing specifications, the American Society for Testing Materials has the soundest set up and approach. This organization is recruited from both consumers and producers. The natural bias of either group thus is tempered by the viewpoints of the other. It is an objective of that society to promote research in the testing and study of the engineering properties of materials. While a great deal of valuable work has been done and is being done, such work needs constant support. Foundrymen are not, generally speaking, sufficiently represented by memberships in that group.

A number of the specifications of the A.S.T.M. have been endorsed by the American Foundrymen's Association. In some cases the A.F.A. has made available some excellent research data. This work could and should be made more extensive, and more foundrymen should take a direct part in this work, in addition to participating directly as members of the A.S.T.M. Some of the A.S.T.M. standards have been adopted by the A.S.A. A number have been adopted wholly or in part by other groups. Influence of the A.S.T.M. specifications is seen in some governmental specifications, and in specifications of some other large consumer groups.

Is it not to the interest of your country, your industry and yourself to give thought, consideration and support to all moves tending toward the co-ordination, simplification and streamlining of metals specifications?

Standard Safety Equipment Co., Chicago recently has purchased the Fairway Laboratories, St. Louis, manufacturers of salt tablets and dispensing equipment. L. E. Dickson is president of the company.

Vocational Guidance

Engineers' Council For Professional Development, 29 West 39th street, New York, recently has published a new vocational guidance booklet on engineering, which was intended for use of high school students and their advisors. The booklet, entitled "Engineering as a Career" is planned to help students decide whether they are fitted to be engineers by giving them a general picture of the characteristics and requirements common to all branches of the profession, and discussing qualities aptitudes needed.

ACID STEEL MELTING PRACTICE

(*Concluded from page* 139)

carbon but the time allowed for the reaction to take place. For instance, a certain amount of carbon removed is sufficient. Although this has been accepted in many cases, no one has been able to standardize the procedure.

Ordinarily a charge consists of foundry returns, plates, punchings and turnings. Up to 40 per cent of foundry returns may be used. To use higher percentages the mechanical properties of the final product may be inferior if the heat is not worked properly or not oxidized thoroughly. If a double slag method is used, larger percentages of remelt can be used with proper care for making of the heat than can be obtained under the single slag practice.

Overcharging of melting equipment lowers refractory life and changes the reaction ratio and may influence the quality of the steel.

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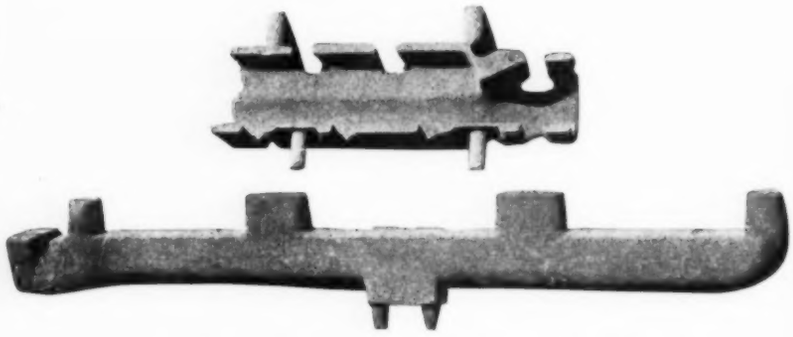

Marine Engine Water Jacket and Exhaust Manifold cores.

The foundry making the cores shown above, after many tests, adopted "C-GRADE" Core Oil to obtain the perfect castings necessary in an engine of this type and to eliminate core blowing trouble.

The manifold core shown here is 30" long and through the use of "C-GRADE" Core Oil, venting was entirely eliminated.

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The dead melt method of making steel consists of melting scrap that contains somewhat the desired amount of carbon. Time element, short production, and long refractory life are the advantages of the dead melt method. Dirty steel, poor castings, low physical properties, and a high cost in the cleaning room are just a few of the disadvantages of the dead melt procedure in steel melting.

In the partial oxidation method the charge is oxidized to get just below the carbon desired and the recarburize. Time element, the removal of some hydrogen, nitrogen and inclusions, refractory life length, and a shorter boil are listed among the advantages. Fine inclusions, use of deoxidizers in stopping the boil, and the fact that the removal of gases is not complete are the disadvantages.

The complete oxidation method requires the use of enough ore to get a boil vigorous enough to lower the carbon to almost a minimum. Low gas content, low inclusion content, better fluidity, higher physical properties, and better castings are the results of this method.

Production Is Slower

Slower production, shorter refractory life, high FeO content in the slag, and the cost of the recarburizing, usually done with the addition of a low silicon pig iron, are the disadvantages. The disadvantages and cost are overshadowed by the fact that the cost encountered due to a low scrap more than makes up for these.

The complete oxidation method with a silicon reduction is very much the same as the preceding method but changes during the last 10 or 15 minutes of the heat. The temperature is raised to reduce the silicon in the slag. This method requires a known and vigorous boil. If extreme care is not taken, the fluidity may be lost. This method cuts the ferrosilicon cost.

The complete oxidation method requires a long vigorous boil to minimize residual Si and Mn. Three methods are used to get the desired boil. Some add the ore right after the heat is completely melted down, others add the ore with the charge, while a third school adds about one-half of the ore just before the melt-down and the remainder after the melt-down is complete.

These additions very seldom are greater than 5 per cent of the charge; in most cases the amount is less than 5 per cent. Rusty scrap does not need as much ore as clean scrap. Mill scale used in some cases produces a faster boil but may raise the sulphur content of the charge. When the heat is completely melted the voltage may be dropped. In complete oxidation the Mn is usual-

ly between 0.07 and 0.15 per cent, silicon between 0.03 and 0.08 per cent, and the carbon between 0.09 and 0.15 per cent. At this point a control analysis should be run for residual alloys to find out if oxidation has been carried far enough.

The slag should be reversed, using sand and lime or limestone. Recarburization should not begin until the temperature boil is reached. Pig iron, petroleum coke, dipping of electrodes, graphite, and broken electrodes are all used for recarburization. During the refining period ferromanganese can be used to control the slag. In the one slag process some let the furnace make its own slag. Others use sand and lime to control the FeO content while others use ladle slag to raise the MnO content.

Analyses of various slags include oxidizing with 35 to 40 per cent FeO, 10 to 15 per cent MnO, and 50 to 55 per cent SiO_2; refining slag containing 15 to 20 per cent FeO, 15 to 25 per cent MnO, and 55 to 62 per cent SiO_2; and refining slag with lime additions with 10 to 15 per cent FeO and 4 to 10 per cent CaO.

Iron Oxide Reduced

Iron oxide is reduced without having to increase the slag volume in the double slag method. The double slag method is better in larger furnaces because it gives a better opportunity to control the slag. The control of the slag in the double slag process depends on the melter's experience and his observations. Periodical slag analysis should be taken to give the melter an idea which slags are the best.

The specific gravity and viscosity tests for slag have not been developed thoroughly but are used to some advantage. The pancake test is made by pouring slag into an open mold about 4 inches in diameter and one-half inch deep. The color of the surface and the fracture of the pancake test, along with shape of the upper surface, denote the condition of the slag. The surface color should be brown while the fracture should be a robin egg blue.

If the surface is sunken or concave, the slag is right for finishing the heat. If the surface rises and is spongy it is best to rebuild the slag, also further refine the heat. Slag control enables one to have a uniform slag and analysis, maximum slag recovery, better fluidity, alloy yield, and physicals.

After the proper temperature is reached, the necessary amounts of ferrosilicon and ferromanganese are added. The ferrosilicon should be added 4 to 5 minutes before the tap and the ferromanganese 2 to 5 minutes before the tap. If both are added together they should be added 8 to 10 minutes before the tap. In some practice the final additions are made in the ladle. The superdeoxidizers are added to the ladle to prevent pin holes or porosity.

Aluminum is either tossed into the ladle or immersed on the end of a rod. Before the aluminum is added, calcium-manganese-silicon, calcium-silicon, titanium or ferrosilicon is added. The amounts used are Ca-Mn-Si, 1½ to 3 pounds per ton, Ca-Si 1½ to 5; titanium 2½ to 5; Fe-Si, 5; and aluminum ¼ to 4 pounds per ton. The best results are reached when the aluminum addition ranges between 1½ to 2 pounds per ton.

In basic practice phosphorus and sulphur can be reduced. The special deoxidizers do not lower ductility, the inclusion content is lower, and the oxidation loss on high alloys is lower. Magnesite refractories are used and on smaller furnaces they usually are rammed in. The charge may have from 30 to 100 per cent foundry returns. The double slag method is used to remove phosphorus and sulphur, the alumina slag method uses aluminum to reduce the slag and lower the FeO content, and the single slag process removes no phosphorus but cuts the time involved during the refining period. In the single slag method

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fluidity is increased, sulphur is reduced and the FeO content is higher.

Super-heating makes little difference in the physical properties of the metal. Using the furnace as a holding furnace has its disadvantages. There is a pick-up of hydrogen and nitrogen and the deoxidizers are removed. It is best to tap to a ladle and transfer from there. Si increases also when the heat is held in the furnace.

The type ladles used are teapot, lip pour and bottom pour. They are lined with a fireclay, ganister, and silica sand mix. The ladle department should be under the supervision of the melter. Cleanliness should be a byword of the ladle department. In heating, the ladles should be heated at a low temperature at first, and then increased heat. Nozzles, stoppers and sleeves should be of the best quality. Poor lining and faulty repair introduce inclusions to the metal. A slag trap should be used to keep the slag in the furnace until most of the metal has been tapped.

Items the melter is usually blamed for are as follows:

Dirty steel—Inclusions from the scrap deoxidation, refractories and the spout. He is sometimes blamed for sand erosion in the mold, which is a fault of the molding department.

Blow holes and porosity—Wet slag making material and alloys, improper preparation of heat, inadequate degasification, moisture in ladles, undue exposure of metal, and sometimes ladle addition of alloys. A fault of the foundry he is usually blamed for is moisture in the mold, low permeability, and moisture condensation on chills and chaplets.

Hot tear—A high inclusion content. Adds to the susceptibility of hot tears, but the foundryman and the designer are to blame because hot tears come from the lack of or the improper design in relieving of stresses at the point of failure.

Low ductility—Improper working of heat, poor slag manipulation, inclusions and critical amounts of ladle deoxidizers used.

C. H. Lorig, Battelle Memorial Institute, Columbus, O., has stated that fluidity is the flow rate of the metal, while the temperature is the heat contained. A large mold with heavy sections requires a low rate of fluidity, while a small mold or one with thin sections requires a higher rate of fluidity. The differences in dry and green sand show very little in the flow of metal. Carbon, silicon, copper, manganese, phosphorus, nickel and aluminum in small amounts increase fluidity but lower the freezing point of the metal. Viscosity, surface tension, gas content, inclusions, and the forming of crystaline structures during solidification decrease fluidity.

This article is from a paper presented by the author at the regional foundry conference held at Purdue university, Lafayette, Ind., in October, 1941 under the auspices of the university, Chicago, Michiana and Central Indiana Chapters of the A.F.A.

THE EDITORS.

Management Course

College of Engineering, State University of Iowa, Iowa City, Iowa. will hold its 1942 summer management course during June 8 to 26. Ralph M. Barnes, professor of industrial engineering, will direct the course which will be devoted to production planning, plant layout, motion and time study and related subjects. A booklet giving complete information on the course may be secured by addressing Ralph M. Barnes, 107 Engineering Building, University of Iowa, Iowa City, Iowa.

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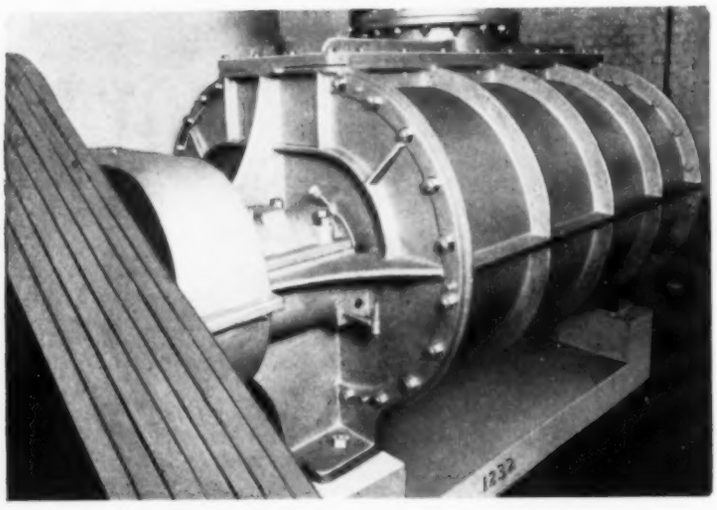

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PLANNING THE NONFERROUS FOUNDRY

(*Continued from page* 137)

on metallurgical subjects one will see the advisability of providing some flexibility in the storage room where the different compositions are kept segregated. It also is to be noted that the available raw materials change from time to time. We are able to get an ample supply of a given grade of metal for an extended time and then suddenly some unexpected circumstances makes it necessary to change the source of supply and thereby change the chemical composition of the raw material.

Therefore, a new bin is necessary for the storage of this new type of material in order that it shall not be mixed with that previous stocked even though the previous stock may only vary from the new by very small fractions of a per cent. Such practice insures accuracy of metallurgical control and thus avoids many defective castings that would otherwise have resulted because of inexperience in the handling of compositions slightly different from that regularly poured.

Provide Accurate Scales

The metal room should be provided with accurate scales and ample supply of such baskets or pans as are necessary for the delivery of individual charges to the furnaces in the melting room so that each charge may be kept segregated from all others and avoid any change of overflow from one to the other which would result in contamination. The floor in the metal room after the bins have been put in place is largely a set of aisles over which more or less heavy traffic is regularly to be expected. Therefore, the floor must be constructed of a material that will resist that traffic with a minimum amount of repair and a maximum amount of service.

There should be every care taken to insure the safekeeping of these different pieces of metal within the bins to which they have been allotted. This will avoid mixing of the contents of one bin with the other but furthermore, it also avoids the danger of pieces falling out on to the men's feet. Thus it becomes a safety precaution to provide the right kind of bin that will avoid this danger to the workmen who must handle the contents of these bins.

The metal room should be well lighted so that there can be no question about what material is being used and what material is going into what bin or what place to put the renewal of a given supply of some raw material.

If a mass production foundry is being contemplated and consequently a large amount of melting is going to demand a large number of heats to be delivered to a large number of furnaces, a layout for the metal room that will permit the use of an over-head system of carrying these charges from metal room to furnace will be found to be most economical of labor and time. Such equipment is not an extravagance under such circumstances, in fact it is absolutely essential if low cost production is to be insured.

Under such circumstances provision must be made for rapid handling of material from the bins to the carrying buckets and this means rapid weighing of each individual item as it passes from bin to bucket but this weighing must be accurate if the product is to be worth anything. Therefore, the type and location of scales must have a good deal of thought on the part of the designing engineer who maps out this metal room. The shape and position of the bucket may influence the convenience with which metal can be moved from bin to scale and then from scale to bucket.

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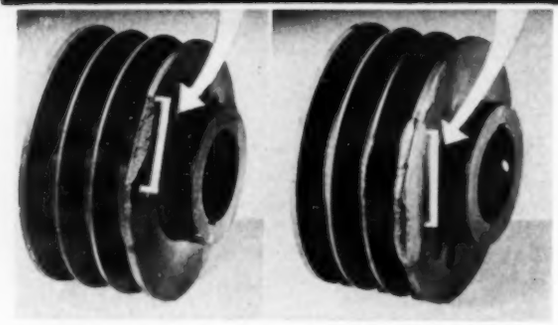

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Such buckets must be arranged on the over-head to be handled not only economically in the metal room where they are charged but also economically in the furnace room where they discharge their contents for later use in the furnace or for immediate use if such can be arranged. Consequently, the buckets must be planned to accommodate the volume of metal that would constitute one heat which means that the size of furnace must be first established so as to determine what size of heat is to be transported from metal room to furnace.

The size of the furnace of course is governed by the class of work to be poured in the foundry. The size of the ladles that will transport the molten metal from the furnace to the pouring floors and other such factors must be considered carefully by the engineer who lays down the general plan for the foundry. In some plants it has been found very economical to organize the furnaces in such a way that while one heat is being melted there is a definite place adjacent to the furnace for the storage of the heat of metal that will be the next successor.

Should Not Interfere

If such a plan is contemplated it should be borne in mind that this space devoted to the storage of the succeeding heat must be located where it will not interfere with the movement of the melted metal from the furnace. Furthermore, it must be located so that it cannot slop over into a heat of metal waiting for an adjacent furnace and thus contaminate the other heat. Such a condition would destroy all the benefits that accrue from a well planned metal room which has done its utmost to deliver heats of metal to the furnace that have been accurately controlled for composition.

With this discussion of the metal room we have covered the larger departments necessary to a nonferrous foundry for the production of the rough castings with the exception of the general storage yard.

Every foundry should have an adequate storage yard where waste products such as burned cores and other materials may be accumulated to insure regular shipment to the dump or to the market where such materials are able to be sold. Broken and cracked crucibles should be stored where they can be gathered for shipment to those who regularly purchase them. The yard should have well paved alleys leading to the different parts of the yard and for the purpose of economical use of these yards spaces on dark days or late hours illumination should be provided that will enable labor to handle material to and from the yard without accidental injury.

Such foundry yards should be well

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protected by adequate fencing and good solid bins should be provided at the desired locations for the storage of such accumulations as have been suggested previously. Furthermore, there should be convenient access to this yard to a railroad siding if such is available and if not at least convenient access should be available to incoming and outgoing trucks for the transportation to and from the yard.

When planning the engineer will do well to consider adequate drainage of such a yard so that there can be no trouble from stagnant water and other such troubles that result from inadequate drainage.

Where fuel oil is to be used for firing the furnaces, the yard should be provided with underground storage tanks that are preferably convenient to a siding and at any rate convenient to the supply brought in by truck and tank trucks. These tanks should be buried so that they do not interfere with use of the yard for storage purposes. They should be substantially supported so they do not move when fully loaded with oil. Obviously good vents should be provided to permit the escape of vapors and air as the tanks are filled from incoming supplies.

Permits Easy Change

In general, the ideal nonferrous foundry not only will be built along the lines we suggested but also will be designed, so far as the building design is concerned, so as to permit of easy change in the size of any given department and preferably the building should be as much of standard construction as possible. This will be both economical in first cost as well as economical in later costs relative to alterations, additions and the like.

Furthermore, the more nearly the buildings conform to standard factory buildings the more desirable they will be should the occasion require their sale. Obviously a factory building that is built especially for a definitely circumscribed use is most surely circumscribed in its marketability. Therefore, the engineer who can adapt to the foundry he is planning as much of standard factory building construction as possible and at the same time achieve the desired ends outlined in this general outline will have built a foundry that will be both economical of operation and more valuable in the market should occasion require its transfer to new owners for a different type of service.

The 44th Annual Convention of the National Metal Trades Association will be held at the Biltmore, New York, May 19 and 20, 1942. Detailed information on program, speakers and subjects will be announced later.

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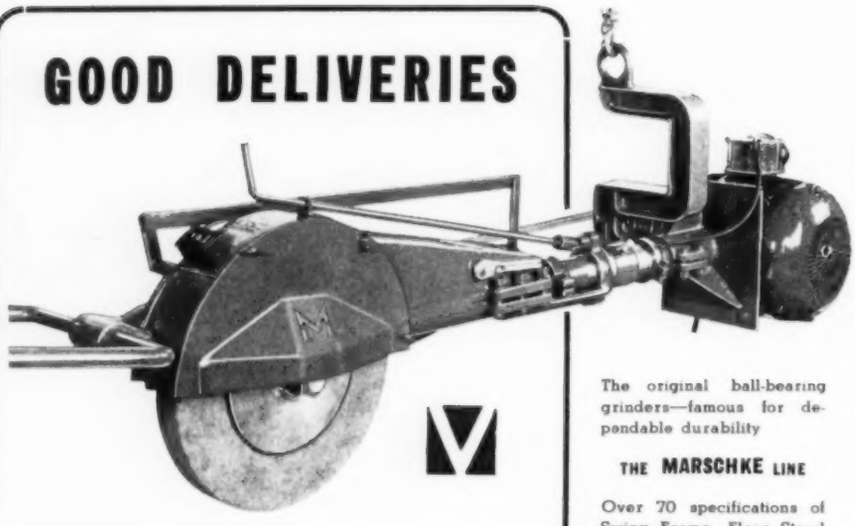

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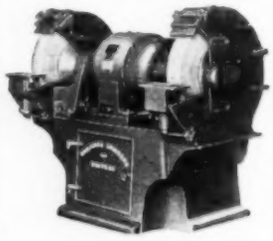

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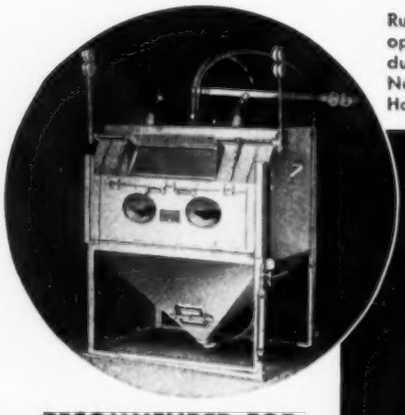

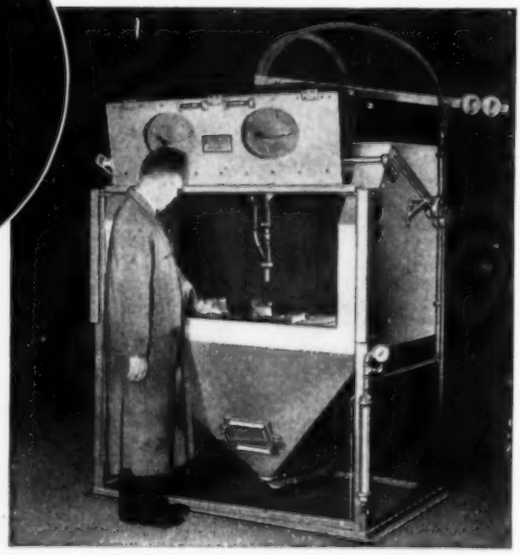

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INFRA RED DRIES SAND MOLDS

(*Continued from page* 134)

They must be of iron or steel, light in weight, and rigid, to produce the accurate castings required by wartime conditions. Sand has undergone closer scrutiny; the grinding effect on sand surfaces, which changes their characteristics, is now accounted for and properly corrected through suitable mixing of new sand and old. Gating, with proper strictures or "control valves" in the runners, has improved casting quality. Given rates of metal flow; elimination of whirling motion of molten metal; reduction of dirt and dross through proper movement of metal into the castings, have all had their part in producing higher grade castings, and in eliminating spoilage.

Promotion of a clean skin on castings is still, however, a paramount problem. For no matter how much care is taken in selection of flasks, in proper gating, in uniform mixing and ramming of the sand, and in the hundreds of other factors contributing to good castings, the surface of that casting still depends upon a clean skin. In the case of iron castings, for example, it is a well known fact that the molten metal, "as stated by authorities" is covered by a thin film. Thickness of this film increases with drop in temperature. Coal dust sand or "skin dried sand" extracts the heat more rapidly than plain sand.

Coal Dust Omitted

The thickened film prevents the metal from burning the face or from penetrating between the sand grains. Coal is omitted from the facing sand and is replaced by approximately half the amount of any core binder used in making core sand mixtures. After the mold is finished it is sprayed, brushed or swabbed with liquid blacking. In some instances the blacking is rubbed on dry by hand and painted with thin molasses water. The mold is then dried by any convenient method. The same procedure is usually followed for producing nonferrous castings in order to obtain a smooth casting surface.

The problem, then, really comes down to one of drying the mold effectively. "Convenience," mentioned above, is not entirely the paramount consideration. Speed, uniformity, low handling costs of molds, are, of course, of equal or greater importance. That is where infra red from radiant lamps "outshines," as we might say, other conventional

methods of skin drying the sand-mold surfaces.

A typical and exceedingly successful installation of infra red lamps was made last summer at the Krodel Foundry, Waterbury, Conn. The simple rigid frames were constructed of 3½-inch electric outlet boxes connected to each other with short nipples as illustrated. This design insured uniform "nesting" of lamps on 6-inch centers. The R-40 reflector type drying lamp was used, each frame containing from 28 to 36 of these lamps, depending upon the size of frame. Ten individual frames were constructed in varying sizes to fit the various flasks. The frames of lamps, in operation, are simply placed over the mold and held horizontally in place by two pins on each frame. Adjustment of distance between mold surface and lamps is accomplished by movable shoulders on the supporting pins. A 2-inch distance between the nearest sand surface and lamps is ideal for fast drying.

Meet Navy Specifications

After seven months of operation Mr. Krodel reports that the important navy specifications to which he must conform have been successfully met, and that rejected castings have been eliminated during this whole period. Labor saving is, moreover, considerable. Formerly a man was more or less continuously employed in putting burning charcoal on trays, arranging them over the molds, waiting for drying of the sand surfaces, and blowing bits of the burning charcoal out of the molds with compressed air.

When the metal was poured, castings were unsatisfactory because trays filled with burning charcoal gave non-uniform heat. Torch drying was equally non-uniform, and equally expensive from the standpoint of labor costs. Now, with infra red lamp drying, labor is reduced to an absolute minimum. A man puts the radiant-heat lamp back over the molds, plugs it into the nearby socket, and goes about his other work. Two hours later he removes the frame. The mold is absolutely uniform in dryness, nothing has fallen into it, and when the metal is poured, gases in sand have been completely sealed, eliminating blow holes in the casting.

Lamps in the frames are wired in series, so that the standard R-40 reflector lamps are operated in pairs across 240-volt three-phase power service, eliminating any investment in lighting transformers. Six 60-amperes plug receptacles to serve the frames have been installed along the wall. When frames are not in use they are hung on wall hooks, eliminating unnecessary waste of floor space.

The total load in the infra red

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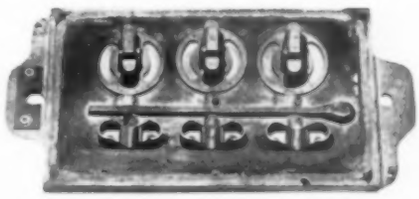

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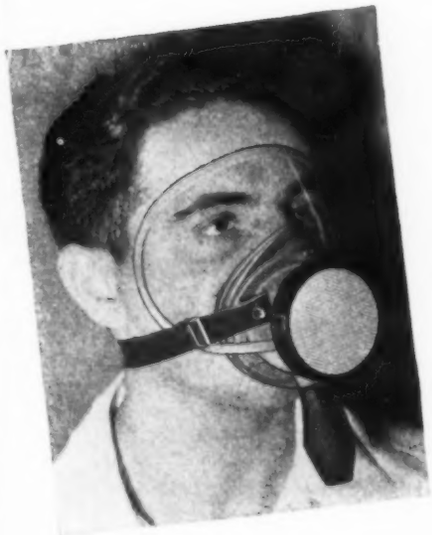

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banks is now 75 kilowatts in this foundry, and on the present power rate for this small plant, each individual lamp costs seven-tenths of a cent per hour to operate. This cost is less than charcoal fuel alone, and it does not include the labor savings. Infra red has proven, in practice, to be the lowest over-all drying cost of any method yet utilized here.

When the lamps are first snapped on, the rising of steam vapor from the sand surfaces is noted within ten seconds. This indicates that radiant drying is practically instantaneous. Since the lamps are entirely open, no enclosure exists, and therefore, the evaporated water vapor is not trapped. This materially hastens the drying and partially accounts for the speed of infra red.

Energy Output Higher

Since the filaments of the lamps operate at 5200 degrees Fahr., the amount of radiant energy per unit area is higher than with any other fuel because radiant energy varies in amount as the fourth power of the absolute source temperature (Boltzman's Law). It easily is seen that fast heat transfer therefore is a natural phenomenon accompanying infra red radiation from the lamp filaments. Drafts of air, as doors are opened, in the foundry room, have no effect whatever on heat transfer, the radiation having no relation to air temperature or air movement within the practical considerations encountered in ordinary practice.

Maintenance cost is low because lamps are good for an individual life in excess of 5000 hours each. This is pre-arranged in the lamp design by utilizing a 240 volt tungsten filament operating on 120 volts at the socket. Investment, compared to convection ovens, is low, the total cost of frames, wired and equipped with lamps, being arrived at approximately by an electrician's estimate recently submitted in the amount of $3.00 per socket, including lamp. Therefore, a 28-lamp frame would be assembled, for example, for $84.00. Lamps are readily available, there being no priority rating required as yet for obtaining them.

Speed is of the essence, in this method of skin drying, for instead of baking the molds in convection ovens throughout the night to obtain comparable dryness of sand surfaces, skin drying to a depth of 1 inch of penetration of dryness is accomplished in 1 hour under radiant lamps. Handling of molds is reduced to a minimum, the frames being simply slipped over the mold in a horizontal position, wherever it is convenient to locate the mold after ramming, and leaving the frame there for from one to three hours, depending on the shape and depth of mold.

Burning is eliminated even on surfaces located close to the filaments, because the rays from the lamps are horizontal and uniform. There is no great difference in heat absorbed by the sand surfaces whether they are three inches or twelve inches distant. This is only true of reflector type radiant heat sources where beams are approximately parallel.

A long stride has been made since the days when torches were used for skin drying of green sand molds. A large middle west foundry now using 400 infra red lamps reports a reduction in labor cost as high as 75 per cent of former costs when kerosene torches were employed. Electric heat in the form of radiant energy is indeed revolutionizing present day foundry practice. While infra red is really as old as the hills, it is so entirely new in its industrial applications that we have, in reality, only tapped the surface of its reservoir of usefulness to mankind. It is no exaggeration to state that infra red is fast becoming a top-flight production weapon of defense.

This article is from a paper presented by the author at the Feb. 18 meeting of the Connecticut Nonferrous Foundrymen's Association held at New Haven, Conn.

THE EDITORS.

Meeting to Consider Health Hazards

The 27th annual meeting of the American Association of Industrial Physicians & Surgeons, and the third annual meeting of the American Industrial Hygiene Association, to be held in Cincinnati April 13 to 17, will feature the problem of hazards to the health of war workers rising from expanding production. Donald E. Cummings, University of Colorado Medical School, is president of the Industrial Hygiene Association and Dr. T. Lyle Hazlett, medical director, Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa., is president of the Association of Industrial Physicians & Surgeons.

A folder entitled, "How To Fight Fires Resulting from Air Attacks," by Harry Desmond Farren, and published by the National Foremen's Institute, Deep River, Conn., includes information on: Types of incendiaries most widely used, methods of extinguishing fires caused by the various types of incendiary bombs, and safety precautions to be remembered. Also included are sketches which illustrate the important points described in the folder's text. Copies may be secured from the institute for $3.75 per hundred.

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The following classified list of advertisers according to products is conducted for the convenience of our readers in quickly locating sources of all types of foundry equipment and supplies. If you are seeking information on any product not listed in this directory, a letter or post card addressed to THE FOUNDRY, Penton Building, Cleveland, will bring you this information by return mail.

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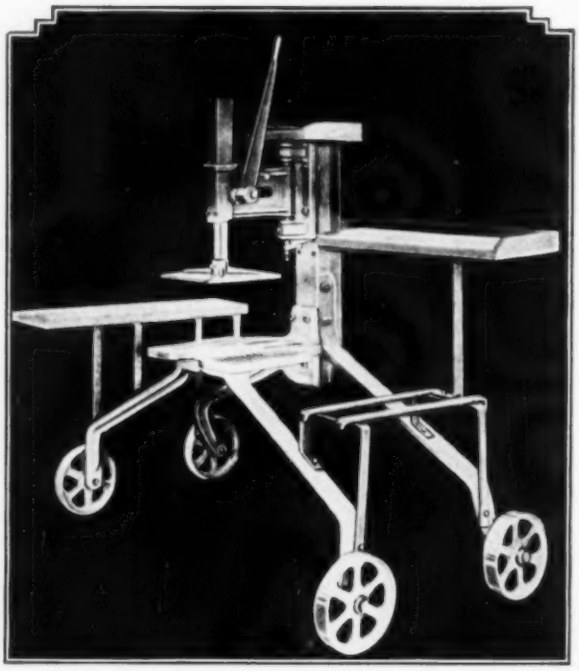

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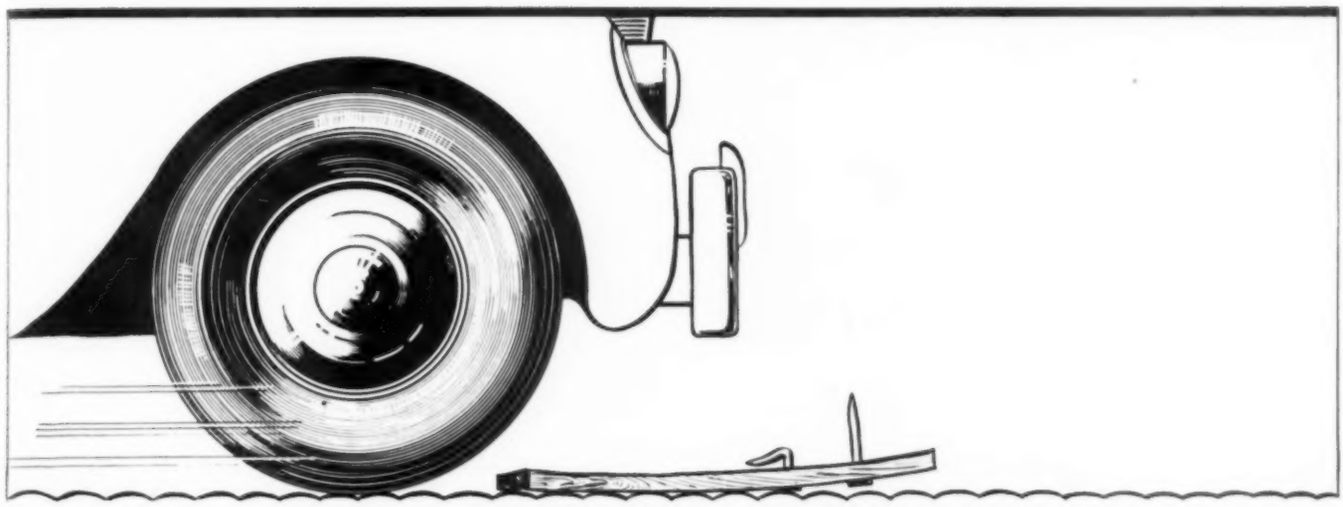

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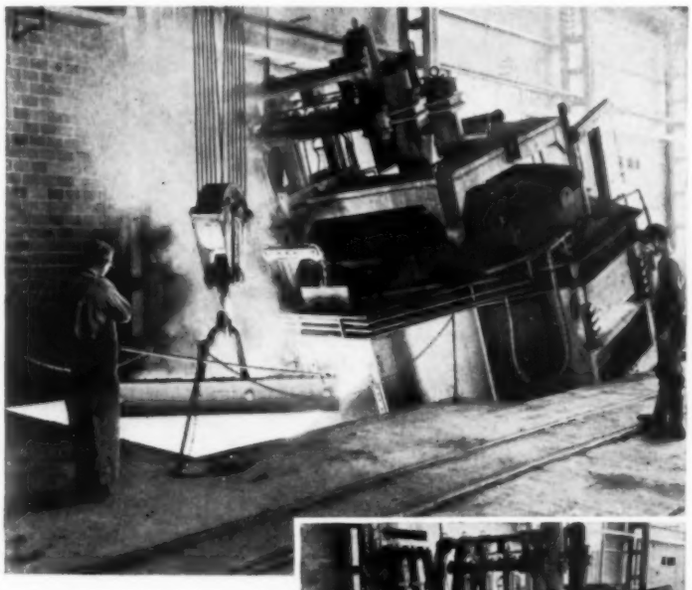

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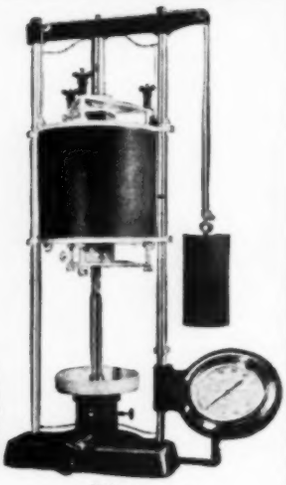
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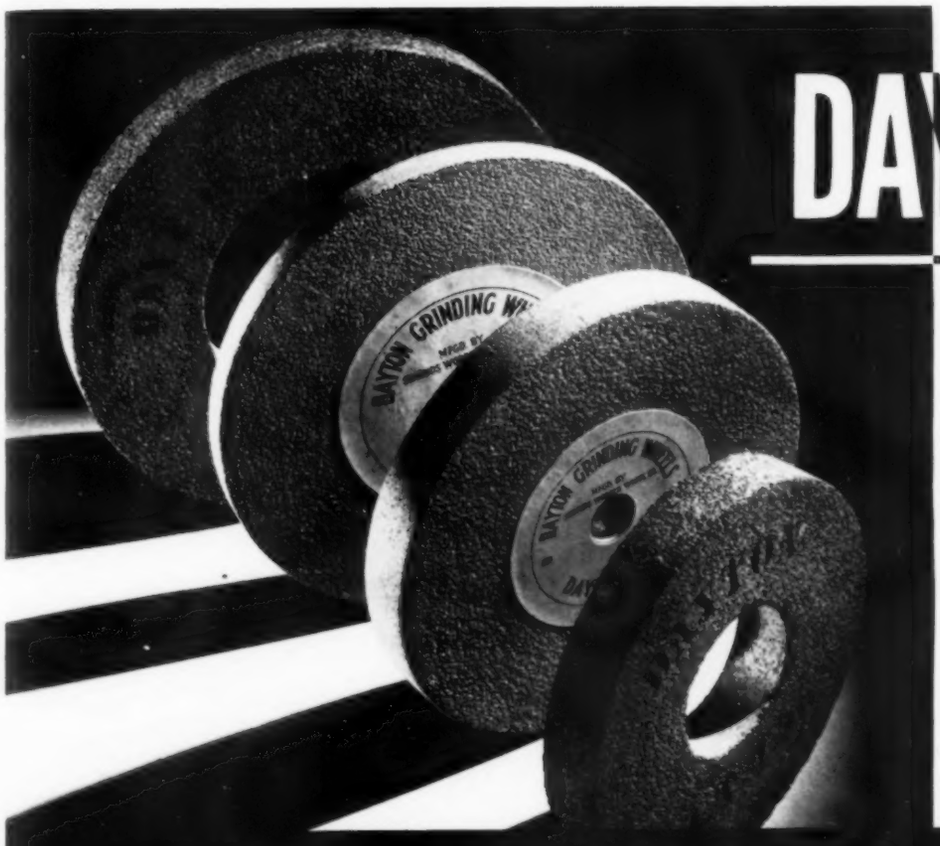

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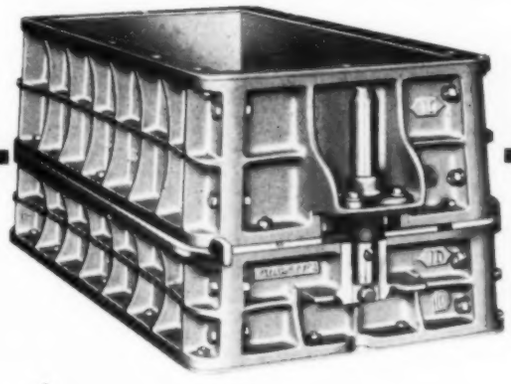

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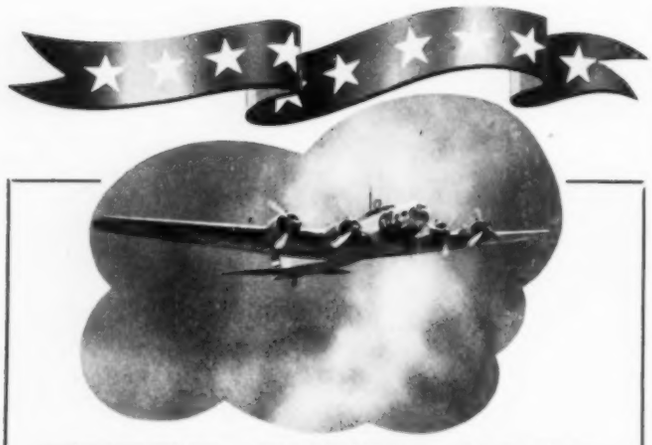

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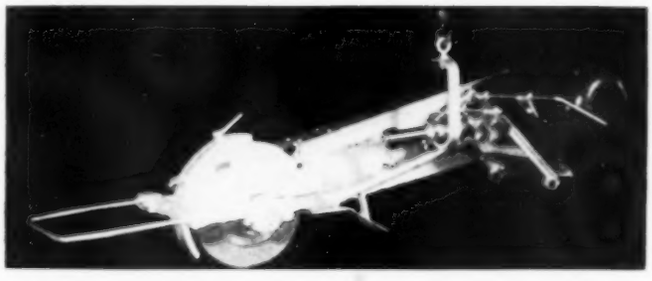

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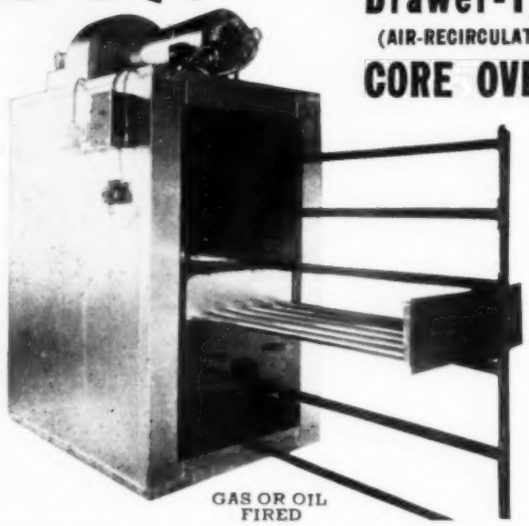

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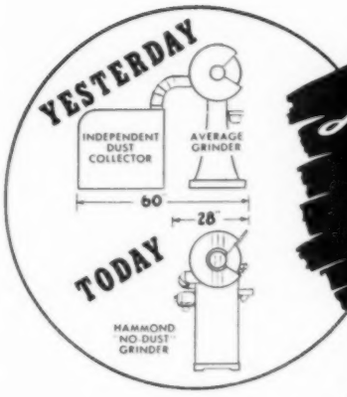

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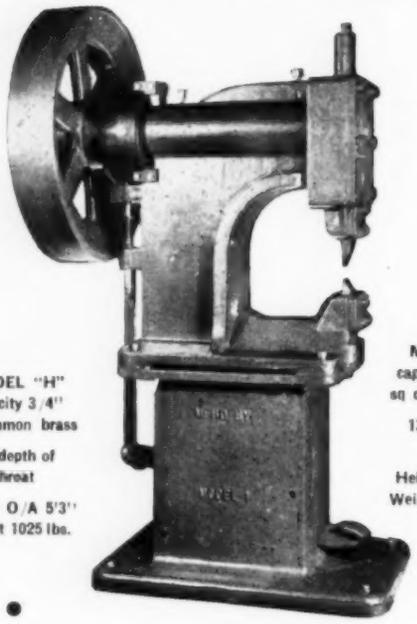

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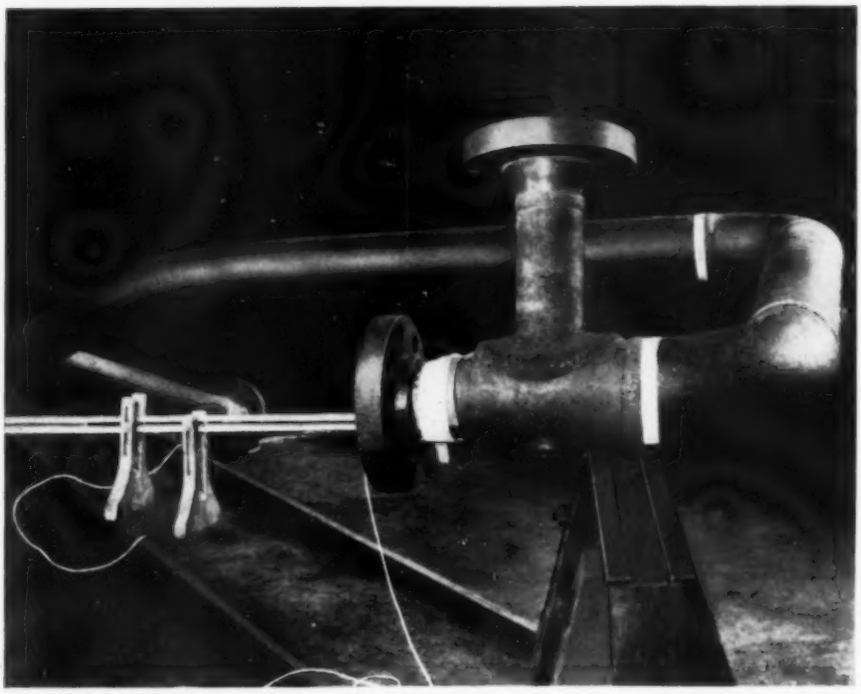

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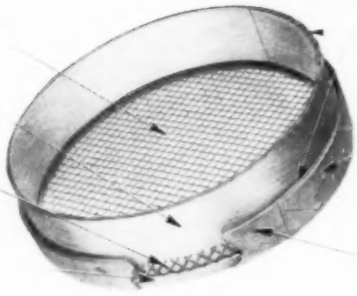

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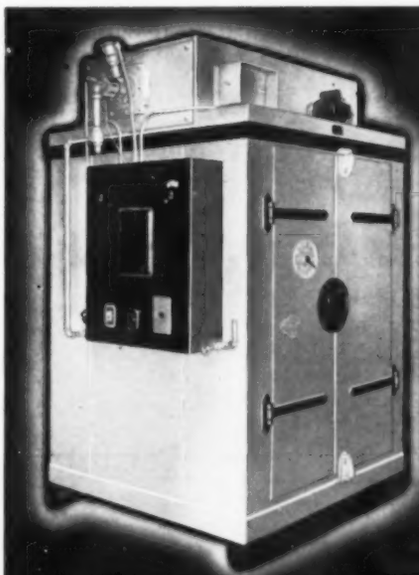

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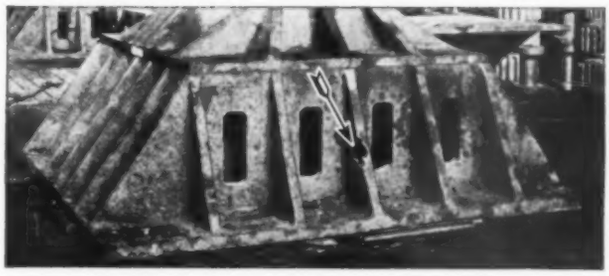

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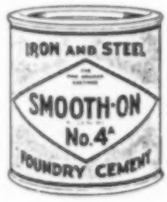

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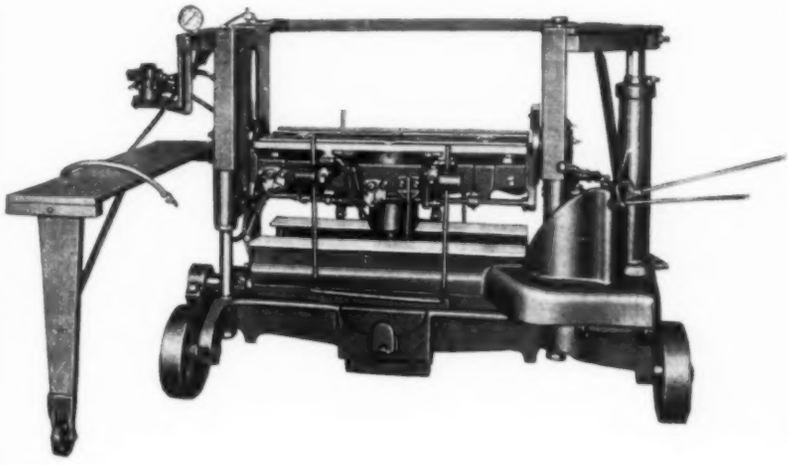

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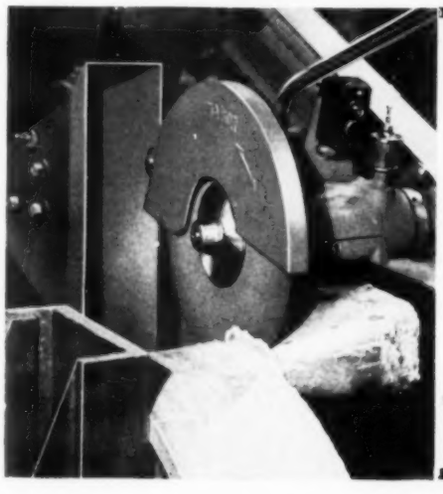

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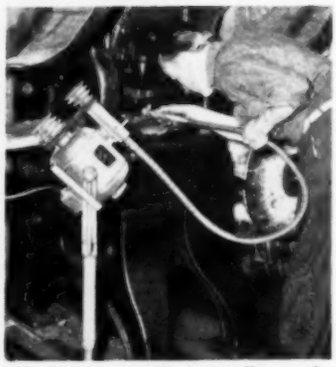

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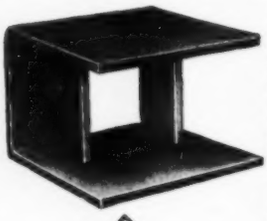

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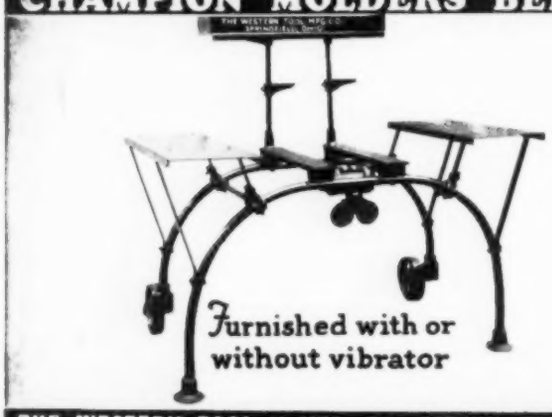

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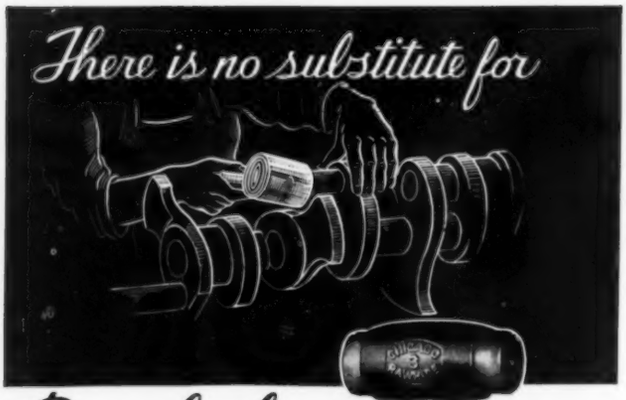

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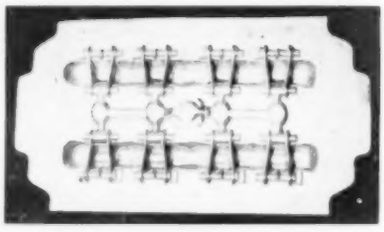

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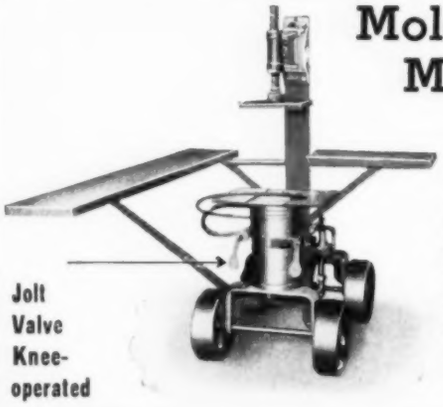

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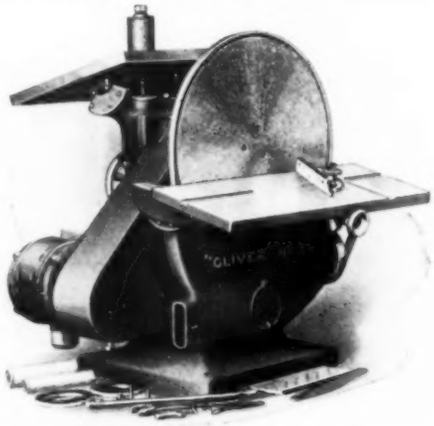

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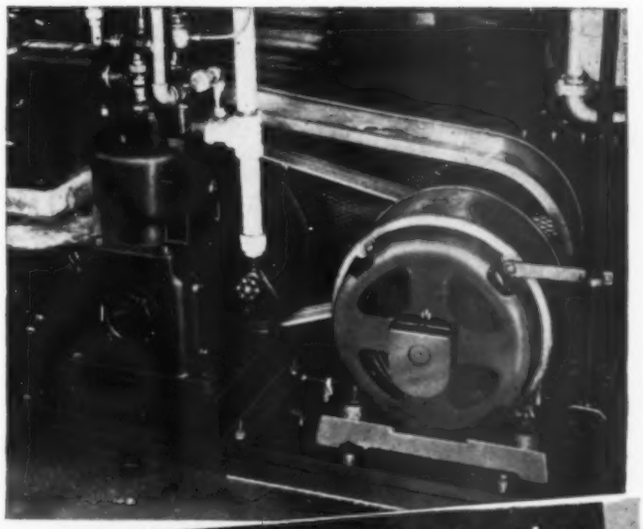

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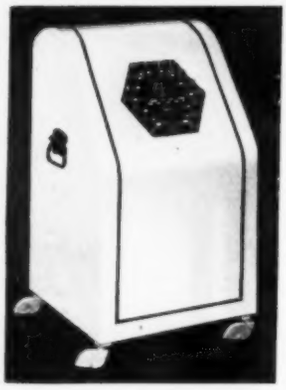

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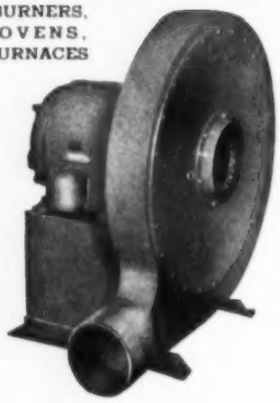

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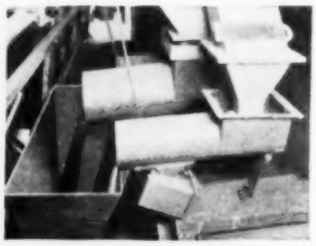

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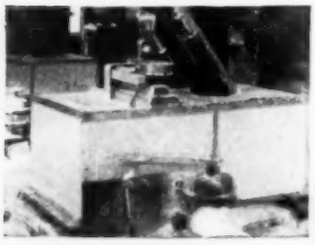

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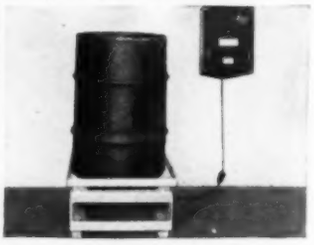

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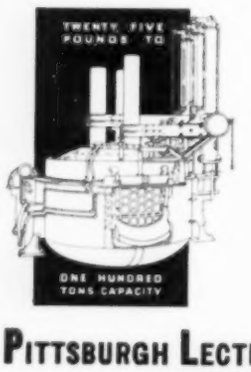

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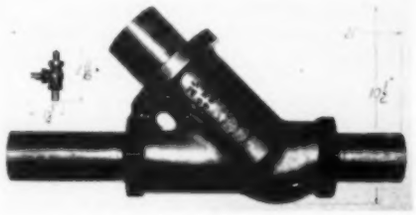


These metal patterns containing three ounces and seven pounds of deposited copper respectively, made from single shrink patterns.

Send us your working wood or metal pattern, single shrink, and we will reproduce the required number of copper patterns to fill a plate.

Accuracies two to three thousandths of an inch.

Send for Folder *Samples upon request*

ELECTRO-CHEMICAL PATTERN & MFG. CO.

3969-3975 Beaufait Ave. **Detroit, Michigan**

A NEW NOZZLE

Made of ceramic and synthetic products. Outlasts six to seven of old style cast iron type.

Write for Particulars

GEORGE PFAFF, INC.

11-02 Jackson Avenue **Long Island City, N. Y.**

PATTERN LUMBER

Dougherty perfect pattern lumber is stored in a heated warehouse—and is fully conditioned to an average of 6% moisture content. All grades ready for immediate use.

BY THE CARLOAD OR PART CARLOAD

FLASK LUMBER

Let Dougherty's dependable flask lumber guard and control your expensive casting jobs. Many grades available for immediate delivery.

DOUGHERTY LUMBER COMPANY

4300 East 68th Street • Cleveland, Ohio

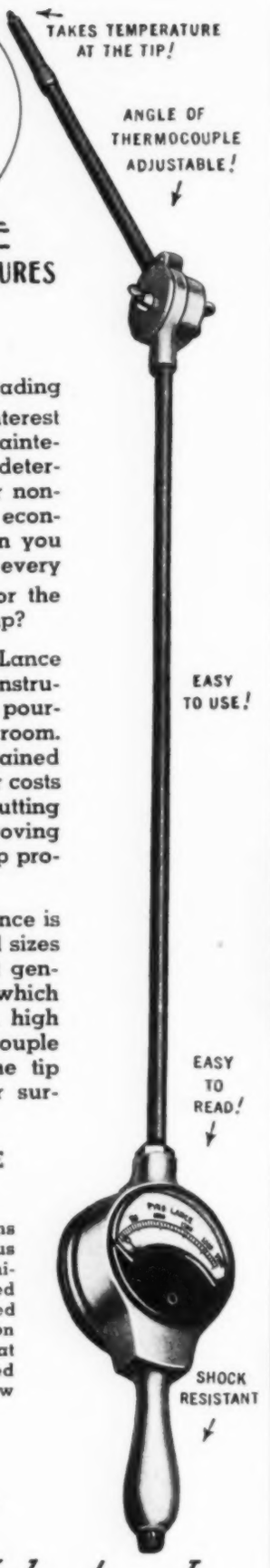
IS IT WORTH

1¢ 1¢

A CRUCIBLE

TO BE SURE

OF YOUR METAL TEMPERATURES



Two cents or less for each reading is actually all it costs in interest on pyrometer investment, maintenance and thermocouples to determine the temperature of your nonferrous metal. Why try to economize and take chances when you can know the temperature of every pot of metal so surely and for the mere cost of a postage stamp?

The "Alnor" portable Pyro Lance is a rugged, shock-resisting instrument built to be used on the pouring floor and in the furnace room. It is a completely self-contained unit which will help you lower costs by reducing scrap losses, cutting your fuel consumption, improving your castings and speeding up production.

Although the "Alnor" Pyro Lance is available in several types and sizes the Type 2981 shown is most generally used and is the one which can be shipped quickest on high priority. Its enclosed thermocouple assures a true reading at the tip unaffected by dross or other surface conditions.

"ALNOR" ENCLOSED TYPE THERMO-COUPLES

Exhaustive tests and comparisons by several prominent nonferrous foundries resulted in their unanimous choice of "Alnor" enclosed type thermo-couples. These proved to be the most economical based on the average cost a reading and at the same time it gives the decided advantage of true readings below the surface of the metal.

May we send descriptive Bulletin No. 1724-A?

Visit Us At The Foundry Show
Booth 117

Illinois Testing Laboratories Inc.

418 N. LASALLE ST. **CHICAGO, ILLINOIS**

ESTABLISHED 1788

THE E. & G. BROOKE IRON COMPANY

Manufacturers of

Basic, Malleable, Foundry, Forge and Low Phosphorus Pig Iron

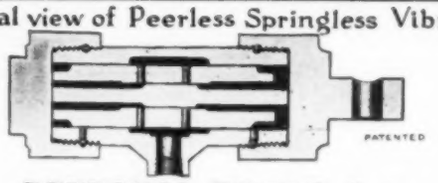
BIRDSBORO, PENNSYLVANIA

PRODUCERS CORE SAND CORPORATION

PITS AT MICHIGAN CITY, INDIANA AND SAWYER, MICHIGAN

MICHIGAN CITY, INDIANA

Sectional view of Peerless Springless Vibrators



PEERLESS TOOLS, Inc.
MILFORD, CONN. U.S.A.

SPEED UP PRODUCTION with Steel-Grip Hand Pads

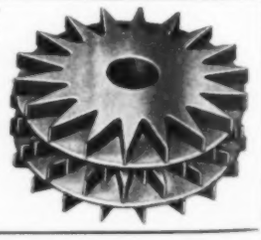
Every minute is vital. *Gain* precious minutes, step up needed production with Steel-Grip Hand Pads. Chrome tanned cowhide with extra palm and thumb patch. Slip on and off easily, give freedom of grip, keep hands cool. Handle more sheets, castings, bars, jagged or rough materials faster. Or what's your problem? Over 4300 *proved* Steel-Grip safeguards may give you an immediate answer. Used by big industrials since 1910. Write for catalog or state your need *today*.

INDUSTRIAL GLOVES COMPANY
203 GARFIELD BLVD. DANVILLE, ILL.
Canada: Safety Supply Co., Toronto

STEEL GRIP

Grinding Wheel Dressers

■ We manufacture the only complete line of dressers and cutters. Write for copy of catalog "F" and name of your nearest dealer.



DESMOND-STEPHAN MFG. CO.
Urbana, Ohio
Canadian D. S. Mfg. Co., Hamilton, Ont.

MANUAL PRESSURE *Can't Slow* THE WORKING SPEED

of A *Mall* GEARED HEAD GRINDER

The pressure-free, high torque in the working tools on a MALL Geared-Head Grinder assure maximum production, a higher quality product, and more output per man-hour for Defense.

These units can be rolled to the work. The light weight tools minimize operator fatigue. The constant high speed increases tool life and reduces spoilage. Maintenance cost is low. And, the electric power is shut off when unit is not in use. Full ball-bearing, quickly interchangeable straight and angle spindles can be furnished for every Grinding, Disc, Cone and Drum Sanding, Drilling, Filing and Polishing job. This three-shift performer will repay its cost in any foundry—Write TODAY for full details and prices and ask for a FREE Demonstration.

MALL TOOL COMPANY
7720 SOUTH CHICAGO AVE. CHICAGO, ILLINOIS

For Better Blown Cores, Use

DEMMLER CORE BOX VENTS

PERFORATED VENTS
No. 00, No. 0, No. 1 or No. 2 holes

SLOTTED VENTS
Brass or Steel
Slots .010" to .015"

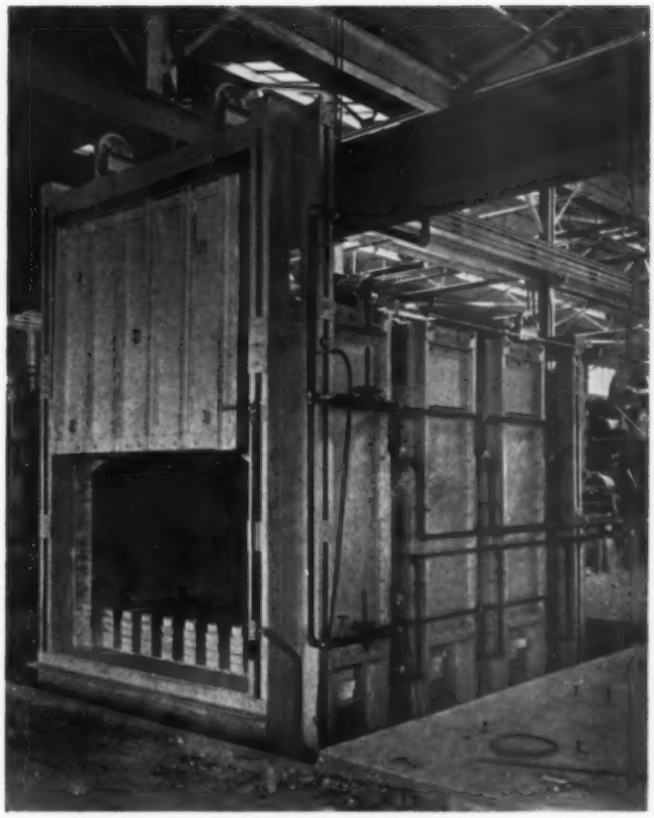
WM. DEMMLER & BROS.
Kewanee - Illinois

BOOKS

On Metallurgy, Iron and Steel Practice, Foundry Work, etc.

We specialize in books of interest to our readers, and will be glad to advise you about the best book for your particular needs.

THE PENTON PUBLISHING COMPANY
Penton Building *Book Dept.* Cleveland, Ohio



VULCAN Furnaces

FOR ANNEALING, NORMALIZING, STRESS RELIEVING AND OTHER HEAT TREATING OPERATIONS

The success of VULCAN Furnaces is founded on the ability of VULCAN engineers to recognize all factors of a particular heat treating problem; to glean from their knowledge and experience the most economical and satisfactory solution; and to follow through with the proper design and construction to insure the desired results.

Whatever the problem, the solution is guaranteed to provide uniform heating, accurate, diversified control, maximum fuel economy and efficient, durable construction.

Write for Information, or Ask to see Representative

VULCAN CORPORATION
1797 CHERRY ST., PHILADELPHIA, PA.

Classified Advertising

Help Wanted

FOUNDRY FOREMAN

Wanted for nonferrous foundry making bronze and aluminum castings, jobbing shop. **Frontier Bronze Corporation, Niagara Falls, New York.**

EXPERIENCED BRASS FOUNDRY FOREMAN

Wanted. Please state experience and references. Address Box 658, The FOUNDRY, Cleveland.

FOUNDRY SUPERINTENDENT

Permanent position in old established firm, Midwestern city, for man experienced in brass, bronze and heat treated aluminum castings. State qualifications, references and salary expected in first letter. Address Box 670, The FOUNDRY, Cleveland.

WANTED

IN JOBBING FOUNDRY LOCATED IN EASTERN PENNSYLVANIA, PRODUCING STEEL CASTINGS, ACID ELECTRIC PROCESS, RANGING FROM 1 LB. TO 3 TONS, A MAN WHO IS THOROUGHLY FAMILIAR WITH HEADING AND GATING AND HAS A GOOD KNOWLEDGE OF MOLDING AND COREMAKING AND IS CAPABLE OF HANDLING MEN; ACTING IN THE CAPACITY OF ASSISTANT TO FOUNDRY SUPERINTENDENT. IN REPLY, PLEASE STATE AGE, EXPERIENCE AND SALARY DESIRED. ADDRESS Box 619, The FOUNDRY, CLEVELAND.

FOUNDRY FOREMEN

Wanted two thoroughly competent malleable foundry foremen. We are looking for men with past records of high performance and who are willing to duplicate past good work in a large modern malleable iron plant. Write giving full details as to references and salary required. Address Box 646, The FOUNDRY, Cleveland.

ATTENTION SALESMEN!

Representatives now calling on foundries regularly are wanted by a well-known manufacturer of high grade line of plumbago, facings, parting, blacking, core wash and allied foundry items. Liberal commission basis. Please advise territory covered, lines now handled, experience with foundry items, etc. Address Box 217, THE FOUNDRY, Cleveland.

FOUNDRY FOREMAN

For Cleveland locality. Must have practical experience on general heavy machine tool semi-steel castings. Good opportunity for right man. Replies held strictly confidential. Address Box 652, The FOUNDRY, Cleveland.

REPRESENTATIVE WANTED

Large industrial concern supplying important foundry requirement wishes representative in the South. Address Box 569, The FOUNDRY, Cleveland.

WANTED: METALLURGIST

CAPABLE OF OVERSEEING THE PRODUCTION OF STRAIGHT CARBON AND ALLOY STEEL CASTINGS ELECTRIC FURNACE STEEL FOUNDRY LOCATED IN EASTERN PENNSYLVANIA.

Prefer a man who is familiar with gamma-raying castings and magnetic testing. In reply state age, experience and salary desired. Address Box 602, The FOUNDRY, Cleveland.

SUPERINTENDENT

For large malleable job order foundry. Good opportunity for qualifying person. Write in detail giving complete story of exact work with various companies, how long a period and references. State age, education, and salary expected. Address Box 625, The FOUNDRY, Cleveland.

ASSISTANT SUPERINTENDENT WANTED

Must be practical foundryman experienced on heavy iron castings. Capable of reading blueprints, estimating molding time on inquiries. College education would assure attractive opportunity for applicant selected. Address Box 660, The FOUNDRY, Cleveland.

Help Wanted

FOUNDRY FOREMAN

Experienced to take complete charge of molding and coremaking in a gray iron foundry located near Cincinnati, Ohio, making machine tool castings and their equivalent. Green and dry sand, crane, side floor, bench and machine molding, light to medium heavy. Prefer a man around 40 years, draft exempt. Give complete detail as to qualifications, salary desired, age and references which will be investigated. Address Box 659, The FOUNDRY, Cleveland.

SALESMAN WANTED

To handle MICAWASH on a liberal commission basis in the United States and Canada. Machinery salesmen etc. will find MICAWASH a profitable sideline. Write to **Refractory Mica Products, Inc., 500 Chancellor Ave., Irvington, New Jersey.**

DEFENSE WORK

Wanted at once seven molders, three coremakers and one cupola tender. Must be reliable and sober. Address Box 657, The FOUNDRY, Cleveland.

WANTED

Leading supply house requires core oil sales manager to have full charge of sales force and advertising. This position has a real future for a high class man with experience and a following. Salary of secondary consideration to securing the right man. Reply (In strict confidence) stating age, nationality and complete experience to: Box 653, The FOUNDRY, Cleveland.

COREROOM FOREMAN WANTED

Familiar with light and medium gray iron and semisteel castings. Attractive salary. Address Box 648, The FOUNDRY, Cleveland.

IRON FOUNDRY SUPERINTENDENT WANTED

Central Ohio. Medium and heavy work. Under 45 age preferred. Splendid future for responsible, experienced man with sound character and references. Address Box 651, The FOUNDRY, Cleveland.

COREROOM FOREMAN

Jobbing malleable foundry making various sizes of cores wants a man to take charge of coreroom. Must have experience with core blowing machines. Write, state qualifications as to past experience, references, salary, etc. Address Box 596, The FOUNDRY, Cleveland.

FOUNDRY SUPERINTENDENT WANTED

Midwest Corporation contemplating adding steel foundry to present line of business, desires contact with experienced, capable superintendent qualified to assist in equipping plant and taking complete charge of production. Prefer graduate mechanical engineer with necessary metallurgical experience. Good opportunity for right man to acquire interest later on, if he desires. Advise experience, education, age and starting salary. Application strictly confidential. Address Box 677, The FOUNDRY, Cleveland.

Positions Wanted

PATTERNMAKER, SHOP FOREMAN

Experienced wood patternmaker, now employed, seeks opportunity as shop foreman or superintendent. Willing to go anywhere. Also has sales contacts. Address Box 655, The FOUNDRY, Cleveland.

CLASSIFIED RATES

Position Wanted: 5c per word, minimum $1.50. Help Wanted: 6c per word, minimum $3.00. All other type advertisements: 10c per word, minimum $3.00. Copy should be received not later than 13th of month preceding date of issue. Address: The FOUNDRY, Penton Building, Cleveland.

Positions Wanted

HEAT TREATER

Experienced treating Alnico and Alcomax castings, also annealing cobalt castings. Employed at present time. Married; capable of taking charge. References. Age 34.
Address Box 675, The FOUNDRY, Cleveland.

GENERAL MANAGER—SALES EXECUTIVE

With valuable experience in managing, building up and maintaining foundry and machinery business on profitable basis invites correspondence preliminary to interview. Ability to direct all office, sales, financial and production activities efficiently and economically, unquestionably established by previous record. Address Box 398, The FOUNDRY, Cleveland.

FOUNDRY FOREMAN

Experienced in brass, iron, aluminum, steel, malleable iron. Excellent references, Returning to Cleveland from east for family reasons. This advertisement being run by employer who wants to be sure a good man gets a preferred opportunity. Address Box 674, The FOUNDRY, Cleveland.

PATTERN FOREMAN ASSISTANT SUPERINTENDENT

Ten years' experience with a successful record as pattern shop foreman and assistant superintendent, in malleable, gray iron and nonferrous foundries. Thoroughly experienced in pattern-making, checking and foundry work. Address Box 676, The FOUNDRY, Cleveland.

CAPABLE BRASS AND ALUMINUM FOUNDRY SUPERINTENDENT

Desires a position. Skilled in production, alloys and melting. Available on short notice. Address Box 640, The FOUNDRY, Cleveland.

NONFERROUS FOUNDRY FOREMAN

Young man with over twenty years' experience desires position within twenty miles of New York City. Production, general jobbing and pressure castings. Address Box 667, The FOUNDRY, Cleveland.

SALESMAN

Gray iron and alloy castings. Can use another source within reasonable distance of Detroit. If interested address Box 639, The FOUNDRY, Cleveland.

STEEL FOUNDRY SUPERINTENDENT

With 20 years' experience in carbon alloy and stainless steel, converter or electric. Technical education, making high grade casting with practical experience. Willing to go anywhere. Address Box 663, The FOUNDRY, Cleveland.

FOUNDRY FOREMAN

For gray iron general jobbing shop. Has had twenty-two years as foundry foreman. Practical man in green and dry sand, medium and heavy castings. Now employed. Address Box 616, The FOUNDRY, Cleveland.

STEEL FOUNDRY EXECUTIVE

Available for building and operating electric furnace and converter shops. Advertiser is an expert in building, managing and operating steel foundries and thoroughly conversant with present U. S. Army and Navy specifications. Address Box 654, The FOUNDRY, Cleveland.

MELTER

Electric furnace melter with some metallurgical experience. Good trouble man. Ten years' experience. Excellent references. Address Box 661, The FOUNDRY, Cleveland.

GRAY IRON FOUNDRY MANAGER OR SUPERINTENDENT

Young executive, broad experience, qualified to assume complete responsibility; successful record applying and developing modern, scientific, controlled methods to produce large, heavy castings of superior quality. Confidential information exchanged only with principals interested in a high grade man for a high grade job. Address Box 637, The FOUNDRY, Cleveland.

Classified Advertising

Positions Wanted

FOUNDRY SUPERINTENDENT

Desires to contact railroad or contract shop. Mixes metal by analysis, handles the different metals and alloys. Last connection was sixteen years as foundry superintendent for a large railroad. Uses chill and permanent molds, also molding machines. Address Box 668, The FOUNDRY, Cleveland.

WORKING FOREMAN

With 25 years' experience in general jobbing work desires position in middle size foundry. Green or dry sand. Work guaranteed at a minimum cost. Free to travel. American citizen. Forty-five years old. Address Box 665, The FOUNDRY, Cleveland.

FOUNDRY SUPERINTENDENT

With 30 years' practical and technical experience in ferrous and nonferrous foundry. Interested in securing new connection. Now employed, can be interviewed at Cleveland Convention. Address Box 664, The FOUNDRY, Cleveland.

FOUNDRY FOREMAN

Fourteen years as foreman; 20 years as a molder, desires a position. Age 53. American born. Jobbing work. Address Box 656, The FOUNDRY, Cleveland.

FOUNDRY SUPERINTENDENT

Experienced young foundry executive. Technical graduate. Now superintendent of well-known foundry making high grade alloy, heat resisting, corrosion and wear castings. Efficient manager, able to handle men, good knowledge of all types of foundry equipment. Excellent cost record. Address Box 635, The FOUNDRY, Cleveland.

PATTERNMAKER

Twenty years' experience. Now employed, but desires a change. Would like connection with established firm. Will go anywhere. Address Box 644, The FOUNDRY, Cleveland.

SUPERINTENDENT

For malleable foundry, 22 years' experience in all classes of malleable castings and light gray iron. Practical man in all departments. A go-getter. Technical education. Locate anywhere. Address Box 662, The FOUNDRY, Cleveland.

Employment Service

SALARIED POSITIONS

$2,500 to $25,000

This thoroughly organized advertising service of 32 years recognized standing and reputation, carries on preliminary negotiations for positions of the caliber indicated above, through a procedure individualized to each client's personal requirements. Several weeks are required to negotiate and each individual must finance the moderate cost of his own campaign. Retaining fee protected by refund provision as stipulated in our agreement. Identity is covered and, if employed, present position protected. If your salary has been $2,500 or more, send only name and address for details.

R. W. BIXBY, INC.

101 Delward Bldg., Buffalo, N. Y.

Wanted-To-Buy

MIXERS WANTED

Used Simpson Intensive Sand Mixers. State size, condition and lowest cash price for immediate acceptance. Address Box 578, The FOUNDRY, Cleveland.

Wanted-To-Buy

WANTED

One No. 2 used United States rotary brass melting furnace. **Berman Foundry Company, 1739 W. 3rd Street, Oklahoma City, Oklahoma.**

WANTED TO BUY

1300 to 1500 air compressor, or enough compressors to make 1500 ft. air. Also 150 KW 2300—250 V motor generator.

RUSSELL STANHOPE,
60 East 42nd Street,
New York, N. Y.

We Want SANDSLINGERS

We are in the market for used **sandslingers.** State type, year, condition and bottom price for immediate acceptance. **Address** Box 207, The FOUNDRY, Cleveland.

Foundries For Sale

IRON FOUNDRY FOR SALE

Health and age compels owner to sell this old established foundry near Boston, Mass. Employs 15 molders. Low taxes and overhead, no liabilities. An unusual opportunity worth investigating. Address Box 549, The FOUNDRY, Cleveland.

FOR SALE

Brass and aluminum foundry. Steel building 40 x 66. Good business; in center of oil industry, good opportunity. Priced to sell. Don't write unless you mean business. Address Box 666, The FOUNDRY, Cleveland.

GRAY IRON FOUNDRY FOR SALE

In the Southwest. Old established business, 35 ton capacity, running 75% capacity at present. Owner retiring on account of age. A swell opportunity for any one wishing to step into a going profitable business. Address Box 650, The FOUNDRY, Cleveland.

For Sale

FOR SALE

Royer model D. C. combination scrap remover, sand separator and blender.

THE ELYRIA BELTING & MACHINERY CO., ELYRIA, OHIO

REBUILT COMPRESSORS AND BLOWERS

2800 CFM, @ 1 lb. North American Turbo Compressor with 20 H.P., 3600 RPM A.C. motor.

1250 CFM, @ 3¼ lbs., 3600 RPM Gen. Elec. with 30 H.P. A.C. motor drive.

630 Buffalo Forge Pressure Blowers, 1200 cfm @ 11 oz., 9½" inlet, 7 x 7 outlet, driven by 7½ H.P. A.C. Motors.

450 CFM, 3500 RPM Gen. Elec. with 6.2 H.P. A.C. motor drive.

SAND VIBRATOR

Jeffery-Traylor, shaker type CVS-8, 6" wide hand deck, capacity 7 to 8 tons sand per hour; with 15 cycle, 110 volt, single phase vibrator motor generator set. Write, wire or phone.

The Motor Repair & Mfg. Co.

1552 Hamilton Ave. Cleveland, Ohio

For Sale

FOR SALE

For immediate delivery, one Model AS Centrifugal Casting Machine, complete. Never used.

THE HARTFORD ELECTRIC STEEL CORPORATION

Hartford, Connecticut

REBUILT

BLOWERS—FANS—EXHAUSTERS

Roots-Connersville positive cupola blowers. Centrifugal blowers for gas and oil burning. Sand blast, grinder and dust exhausters. Ventilating fans.

GENERAL BLOWER COMPANY

406 N. Peoria St. Chicago, Illinois

AIR COMPRESSORS

BELTED—176 ft., 355 ft., 540 ft., 676 ft., 752 ft. & 1300 ft.

ELECTRIC—355 ft., 528 ft., 676 ft., 807 ft., 1302 ft., 1723 ft., 2022 ft., 2200 ft., 2800 ft., 3600 ft., & 5000 ft.

STEAM—368 ft., 500 ft., 800 ft., 1221 ft., 1640 ft., 2200 ft., & 3000 ft.

DIESEL—368 ft., 603 ft., 900 ft. & 1300 ft.

GASOLINE—110, 160, 220, 310, 1300 ft.

R. C. STANHOPE, INC.

60 East 42nd St. New York, N. Y.

FOR SALE

1—48" x 60" Sly steel tumbling mill
1—26" x 48" Sly steel tumbling mill
1—Type "K"-84" American sand cutter, Buda motor
1—20" Davenport jolt stripper
1—24" International type "R" rollover
3—No. 112 Milwaukee jolt squeeze strip
5—No. 11-32 Nichols jolt squeeze strip
5—Arcade "Modern" squeezers
2—No. 104 Milwaukee jolt squeezers

CHAMPION FOUNDRY & MACHINE CO.

1314 West 21st St. Chicago, Ill.

FOR SALE

1—No. 10 Paxson Colliau cupola, substantially new. **Montague Machine Company, Turners Falls, Mass.**

Classified Advertising

For Sale

FOR SALE

(1) 3-ton Heroult furnace complete except for controls and transformer.
(2) 1000 lb. Detroit rocking type electric furnace complete with 300 KVA 4600 volt transformer and panel board.
(3) No. 3 Simpson intensive sand mixer 1936 complete with air operated discharge door, motor, gear reducer and spare muller tires.
Address Box 671, The FOUNDRY, Cleveland.

FOR SALE

1—Pangborn No. 2 type GF blast cleaning barrel, like new. Priced reasonably. Call or write, **Kelly Foundry & Machine Co., P. O. Box 232, Elkins, W. Va.**

FOR SALE

1—3 ton Harnischfeger Corporation crane, 32' ft. span, cage operated, 220 Direct Current. Address Box 672, The FOUNDRY, Cleveland.

FOR SALE

Osborn No. 82 pattern drawing stripping plate jolt squeezer, table 32" x 36". Bought for special job. Condition equals new. **The Taylor & Fenn Company, Hartford, Conn.**

EQUIPMENT IN STOCK
GUARANTEED IMMEDIATE SHIPMENT
MOLDING MACHINES

(1)—Tabor Jarr Squeeze Flask Lift Stripper Table 18" x 20½".
(1)—No. 81 Osborn Jolt Squeeze Stripper Machine.
(1)—Osborn No. 602 Jolt Rollover Pattern Draw.
(1)—International Jarr Table 24" x 36".
(4)—Herman Jarr Table 40" x 60".
(4)—Herman Jarr Strippers Table 40" x 60".
(6)—Herman Jarr Rollover Pattern Draw, Table 30" x 36", 40" x 55", 40" x 60".
(1)—40" x 50" Tabor Jarr Rollover Pattern Draw.

MISCELLANEOUS ITEMS

(1)—Gas Fired Young Bros. Core Oven 12' 6" deep, x 8' wide x 7'6" high, double doors.
(1)—¾" Cap. Shuster Power Sprue Cutter.

AIR COMPRESSORS

(1)—12 x 10 Penna. 360-CFM. @ 100 lbs. idler, belt, 60-H.P. C.W. slip ring motor, 220/3/60-cy. & control.
(1)—12 x 12 Chicago N.S.B. 375—CFM. @ 100 lbs. with idler, unloader and lubricator.
(1)—2-stage Ing. Rand size 16 & 10½ x 12 cap. 770-CFM. @ 75 lbs. direct connected to a 125-H.P. G.E. Syno. motor, 2300/3/60-cy. exciter, control, after cooler and tank.

ELECTRIC MONORAIL HOISTS

(30)—½ to 5-ton, 1 and 2-motor, Fl & Cage operated 200/440-volts, 3-PH. 60-CY. 110 and 230-VDC.

OVERHEAD ELECTRIC TRAVELING CRANES

1 to 50-ton Cap. 18' to 91'0" span, 220/440-VAC and 230-VDC. We operate the largest crane Rebuilding Plant in the country, send us your specifications for Cranes, Electric Monorail Hoists, Crane Motors, Standard Motors, Steel Buildings and Runways. We can quote you on equipment rebuilt to your specifications.

ELECTRIC STEEL FURNACE

(1)—3-ton Heroult, with 1500-KVA transformer, 2300-volts, 3-phase, 60-cycle. Rebuilt To Your Specifications.

T. B. MacCABE CO.
4304 Clarissa St. Philadelphia, Pa.

For Sale

Are **YOU** in need of foundry equipment?

Do **YOU** have equipment to sell?

Are **YOU** looking for experienced men?

Do **YOU** want to obtain a position?

If **"Yes"** is your answer to any of the above questions, may we offer the services of the Classified Advertising Department of The FOUNDRY? For rates write *today* to:

The FOUNDRY

Classified Advertising Department

Penton Building Cleveland

FOR SALE

1—Practically new Wilbraham cupola blower, geared to 50 h.p.—G. E. motor, mounted on cast iron base.....$480.00
1—Phillips-McLarens wet pan muller, belt drive $280.00
1—No. 101 Osborn jolter.....$65.00
For complete list of equipment and description write:

E. A. MEYER
Green Bay, Wisconsin

REBUILT USED EQUIPMENT

Molding machines, all types; tumbling mills; furnaces; cupolas; air compressors; hoists; rammers, all types; ladles, all types; sand mixers; sand blast tanks; core machines, etc. All equipment rebuilt and guaranteed. All sizes used steel flasks.

HAYNES FOUNDRY EQUIPMENT COMPANY
1734 Lake St. Kalamazoo, Mich.

FOR SALE

Odd size skim gates. Consists of clippings and shearings of perforated tin plate in mixed sizes suitable for use as skim gates. Packed in 100 lb. kegs. Price 12½c per lb. f.o.b., Geneva, Illinois. **Smith & Richardson Mfg. Co., Geneva, Illinois.**

FOR SALE

Stripping plate molding machines. Have been used for flywheels 20" to 55". Easily adapted for other work. Good condition but no longer needed. WITTE ENGINE WORKS, Kansas City, Mo.

For Sale

FOR SALE

One 24" flat belt Fox swing grinder.
One type AU-1 Pangborn pressure tank.
One 50-lb. Oxweld Acetylene generator.
One 15-ton Cleveland Crane sheave and block.
One No. 0 Whiting cupola. Address Box 673, The FOUNDRY, Cleveland.

CORE SAND DRYER

No Priority Needed!

Rockwell rotary dryer, 18" diameter inside the brick, 12' long. Complete with base, reducer and burner. Lined with brick—all ready to go—$500.00. **The Federal Foundry Supply Company, 4600 East 71st Street, Cleveland, Ohio.**

FOR SALE

1 used 36" O. D. Whiting cupola size to 24" with G. E. Ingersoll-Rand blower and cupola control system. Also complete auxiliary. Equipped for light gray iron foundry, whole or part.

ROY V. KENNEDY COMPANY
ENdicott 7123 1149 East 40th St.
Cleveland, Ohio

SPECIAL DEFENSE BARGAINS

Wet Tumbling Barrel—N. Ransohoff Co., "Ideal" end loading—end unloading return tumbling barrel motor drive. Barrel 36" x 36"—3 cu. ft. cap., continuous or batch operation. Ideally suited for small brass castings.

Air Compressor Unit—Ingersoll-Rand 10 x 10 with 40 H.P. Motor, 210 CFM displacement.

Fans—Blowers—Exhausters for cooling, ventilation and dust or fumes removal. Multivane Fans in all st'd. makes and styles for large air volumes at low pressures.

Fan or **Centrifugal** style blowers—Maxon-Premix—from No. 1 to No. 6, Spencer Turbine, Gen. Electric, Am. Blower Co., Sturtevant, Buffalo, Clarge, Ilg etc. for Gas or Oil fuel Combustion.

Rotary Pressure Blowers — Roots-Connersville, Garden City, Green, Piqua, Sturtevant, Am. Gas Furnace Co. etc.

Furnaces for Brass and Aluminum Melting—Hausfeld Tilting open flame 400 lb. brass cap.; Booth Electric 725 lb. brass cap. with instruments and transformer. Stationary Furnaces, swing top for crucibles No. 6 to No. 150 and open top for iron pots up to 300 lb. aluminum.

Schwartz Furnaces—1—60" & 1—42".

Molding Machines—Osborn No. 401 stationary jolt-squeeze-rollover-draw 20" x 30". Osborn No. 404-S, No. 405-S and No. 85 Pit Type jolt-squeeze-strippers. "Berkshire" 34" wide stationary air squeeze. "Tabor" 8" cyl. air squeeze. "Battenfeld" (Johnston & Jennings) stationary jolt squeeze; 5 in. stock. Arcade—portable 2 in stock 8 & 10" cyl. Adams—Stationary hand squeezers 48" wide 2 in stock. Mumford—Stationary Air Squeeze 14 x 18" platen. Tabor—Hand operated, portable, Rollover, draw for 20 x 30" flasks or core boxes, 3 in stock. Nichols—10" x 32" Stationary 20 available. Tabor 28" x 41" portable shockless jarring rollover draw.

Sand Blasts—pressure generator tanks with hose & nozzles. Sly wet Cinder mill.

Sand Blast Barrel—New Haven 36 x 46" Motor direct connected.

Sand Blast Tables Pangborn 6' and 8' dia. self contained fine for brass and iron castings.

Blystone Sand Mixer. 5 cu. ft. cap.

Combs Sand Riddles—2—type V & 1—type CS.

Tell us your needs.

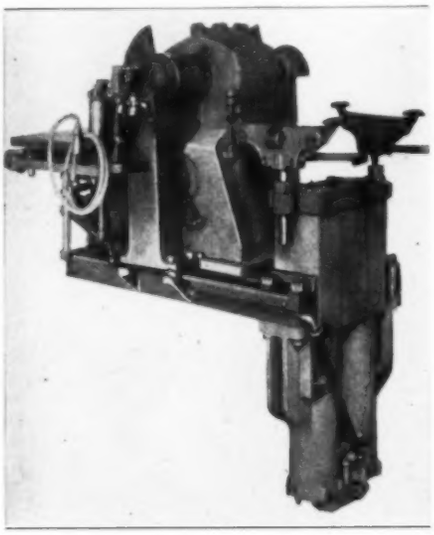
CLIFTON MACHINERY CO.
1023 W. 6th CINCINNATI, O.

"SCULLY-JONES" RECONDITIONED FOUNDRY EQUIPMENT

◆ Ready for immediate shipment, this equipment has been completely rebuilt in our modern machine shop. Prices on request.

INTERNATIONAL MOLDING MACHINES

1 49 x 16" draw Type "F." fitted with air equalizers, rollers in the draw section and hand operated core box clamps, jar plate 100" long, 6000 lbs. cap.



INTERNATIONAL TYPE "F"
(Enclosed Model)

48 x 16" draw Type "F"—4200 lbs. cap. @ 80 lbs., table size 48 x 83".

37 x 16" (adjustable draw, can be set to max. of 25") Type "F" table size 34 x 70", 3800 lbs. cap. @ 80 lbs. press.

31 x 16" draw, Type "F" table size 31 x 60", 2500 lbs. cap. @ 80 lbs. pres., with roll-off table and air equalizers.

42 x 16" draw Type "F" (with double cylinders) 3400 lbs. cap. @ 80 lbs. pressure.

27 x 12" Type "F" International (enclosed cyl. type) 1400 lb. roll-over capacity @ 80 lbs. pressure.

Herman INDEPENDENT TURN-OVER and PATTERN DRAWING DEVICE MACHINES

42 x 72" jar roll-over, 40 x 72" jolt table.
46 x 56" jar roll-over, 40 x 50" jolt table.
40 x 60"—15" dia. cyl. 9500 lbs. cap. @ 80 lbs. press., 42 x 60" jolt table.

CORE MACHINES

Champion Type "CA" stationary Plain Core Jarring Machines, 13½" table, 4" dia. cyl.

No. 832 Milwaukee hand jolt and roll-over, foot draw, portable, 15 x 32" table, max. flask size 24 x 32"—30" height pattern table.

HERMAN BUMPERS

60 x 72" table, 15,000 lbs. cap. @ 80 lbs. press., 19½" dia. cyl.

50 x 50" table, 6100 lbs. cap. @ 80 lbs. pressure.

40 x 50" table, 6400 lbs. cap. @ 80 lbs. press., 13" dia. cyl.

Sly CONTINUOUS TUMBLING MILL

19 ft. long 26" dia. inside of liners, center of barrel and liners perforated and covered by steel hood with exhaust connection, equipped with silent chain gear drive (without motor).

JOLT SQUEEZE & POWER STRIP

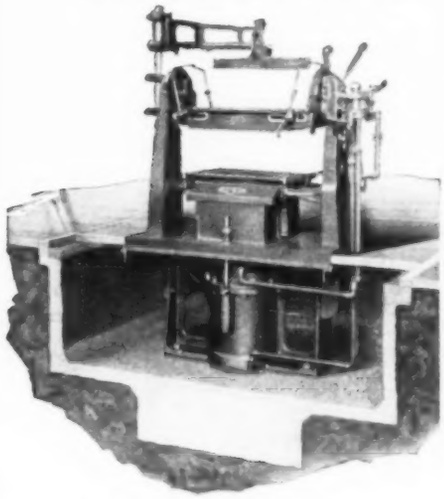
No. 142 Milwaukee, stationary, stripping cap. 1200 lbs. @ 80 lbs. press., draw 6" table 19 x 35"—open end type.

No. 152 Milwaukee, portable, max. pattern draw 6", pattern length 28" width 20", 1200 lbs. cap. @ 80 lbs. press., 22 x 30½" table.

No. 703-6 Osborn jolt squeeze and strip, 21 x 28" table, stationary, length of opening in lifting frame 34", 6" pattern draw, 8" cyl. dia. 1000 lbs. jolt. cap. @ 80 lbs. pressure, distance from lifting frame to squeeze head 24¼", flask length 44½", with roll off conveyor.

No. 703-5 Osborn, same as above excepting 17 x 35" table.

OSBORN Molding Machines



No. 332, jolt roll-over and squeeze with roller conveyor attachment, flask cap., max. length 36" width 26" pattern draw 9"—750 lbs. cap. @ 80 lbs.

No. 333, flask cap. max. length 45" width 32" —pattern draw 11", 1400 lbs. cap. @ 80 lbs. press. squeeze cyl. dia. 19".

No. 403-W Osborn jolt roll-over and pattern draw, flask cap. 52 x 36", 12" draw, with swing-out Mold Table, Power Roll-Over.

No. 513-E Osborn Air Jolt and Electric Roll-Over, pattern draw and Run-Out Car, flask length O/A 124" width 72" capacity, width of roll-over table 60"—pattern draw 30"—cap. @ 80 lbs. pressure 12,000 lbs. with 15 HP Motor.

SAND MIXERS-CONDITIONERS-THROWERS

No. 3, 8 ft. dia., 11 x 32" heavy duty type double Mullers, arranged for motor drive, but without motor, with gear reduction and outboard bearing.

Model "B" Royer Sand Separator and Blender, cap. 300 lbs. sand per min., portable, with AC Motor.

Model "D" Royer Sand Separator and Blender, 800 lbs. sand cap. per min., portable with 3/60/220V AC Motor.

ELECTRIC GRINDERS

Black & Decker "Constant Cutting Speed" FLOOR STAND, max. wheel size 24 x 4", ball-bearing spindle, with 10 HP 230V 1035 RPM DC Motor, totally enclosed. Push Button Control with Magnetic Type Starter.

Murray A-92 VERTICAL DISC GRINDER, take 26" dia. disc, ball-bearing, 10 HP 3/60/440V AC Motor, with counterweight for extra shaft.

LOT 34 x 34 x 48" x 1" plate Sly SQUARE MILLS, in line, or will sell individually, driven from tight clutch pulley.

OVERHEAD ELECTRIC TRAVELING CRANES

50-ton MORGAN approx. 35 ft. span Power House Type, 4-motors, with Auxiliary, chain on main drum, cable on Aux., 600V DC Motors (still erected on original runway)

25-ton Walker 55 ft. span with 5-ton Aux. cage control, motors 550V DC, chain on main hoist and cable on Aux. girders single web construction, truck ends are equipped with large steel wheels.

7½-ton Bedford, 55 ft. span, 2-motors, 220V DC, cab control (same as 3-motor type, Trolley Travel and Hoist-same motor, by means of clutch).

5-ton Shepard 18'5" span, 1-motor 220V DC, trolley hand racked, bridge hand racked, box girders.

2-ton Detroit LoHed Ice House Type, 26 ft. span, 3-motors, 220V AC, floor control, 9-10 ft. lift.

1-ton Detroit LoHed Type "H" Ice House Cranes, 29 ft. span, double "I" Beam Girders, 220V AC, floor control, 9 ft. vertical lift.

ELECTRIC HOISTS

1000 lb. Shepard, 1 HP 110V DC Motor, with Trolley, 14 ft. lift.

2000 lb. Y&T Model 20B Elec. Chain Hoist, 16 ft. lift, 220V AC Motor, floor cont.

2000 lb. Shepard equipped with 2¼ HP 110V DC Motor, 18 ft. lift, floor cont.

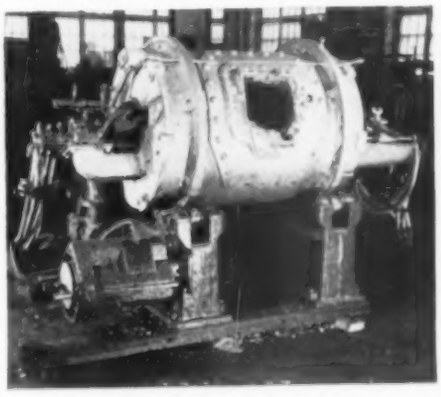
2000 lb. Shepard Lift-A-Bout with Trolley, 2¼ HP 110V DC Zobell Motor, 18 ft. lift, floor control, speed 20 FPM.

3000 lb. American No. 2, equipped with Ideal Elec. 3/60/440V AC Motors, 1½ HP Trolley and 3 HP Hoisting motor.

5-ton Detroit, with Top Hook, floor cont. with 5 HP 230V DC Motor.

7½-ton DETROIT equipped with 6½ HP Watson 230V DC Motor.

DETROIT ELECTRIC FURNACE



Detroit 350 lb. Rocking Type ELECTRIC FURNACE complete with Transformer 200 KVA, 2700 volt, 90 volt secondary, oil circuit breaker and instrument panel.

CRUCIBLE TYPE FURNACE

Stewart, stationary type, for No. 80 crucible, oil fired, (brand new) for prompt shipment.

Stewart, stationary type, line for No. 35 crucible, gas burner, complete with No. 35 Blower, 1 HP single phase 110-220V AC Motor.

Above items represent but a portion of our used or reconditioned FOUNDRY and INDUSTRIAL EQUIPMENT BARGAINS . . . Send for our current STOCK LIST No. 69 which shows COMPLETE STOCK on hand at our CHICAGO WAREHOUSE and advise as to your exact requirements.

SCULLY-JONES & COMPANY **(Foundry Division) 19th & ROCKWELL STS.**
PHONE LAWNDALE 8770 — CHICAGO, ILLINOIS

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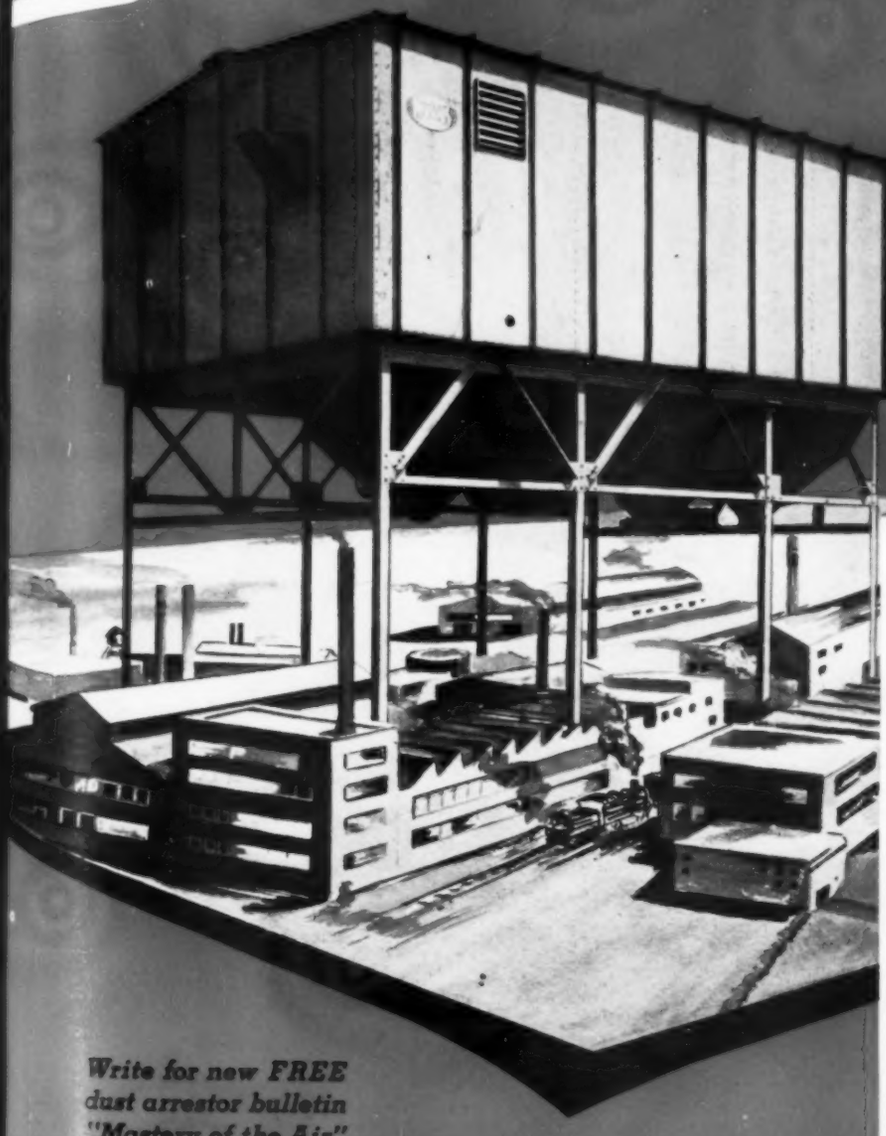
PARSONS OVAL BAG Dust Arrestors



Masters OF THE AIR

Dust and Dirt on the loose in any plant means costly inroads on the health of employees, the efficiency of the plant, deteriorating of machinery and buildings and the slowing up of production.

The cause is unavoidable but the cure is simple, positive and absolutely effective ... Parsons Oval Bag Dust Arrestors. Engineered and built to outperform and outlast them all and they do just that. Parsons "Ovals" are backed up by an engineering staff with nearly a quarter of a century of experience in designing.

Parsons "Ovals" maintain their efficiency for an average of more than ten years, staying new in filtering capacity because they will not plug when handling dust even from moist materials. Built for years of hard, tough going Parsons "Ovals" pay for themselves in no time and then go on paying dividends for years.

It's engineering brains, experience, quality materials and craftsmanship that make Parsons Oval Bag Dust Arrestors the talk of the trade and the choice of the field.

Write for new FREE dust arrestor bulletin "Mastery of the Air"

PARSONS ENGINEERING CORP.

2545 EAST 79th STREET • • • CLEVELAND, OHIO

CHARGING THE *Modern* WAY *for* VICTORY

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Improved Bottom Pour Ladles — Metal Pouring Systems — Crane & Monorail Systems
For Metal & Mold Handling — Furnace Charging Cranes — Electric Mold Skin Driers

MODERN EQUIPMENT COMPANY

PORT WASHINGTON, WISCONSIN

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PORT WASHINGTON, WIS.
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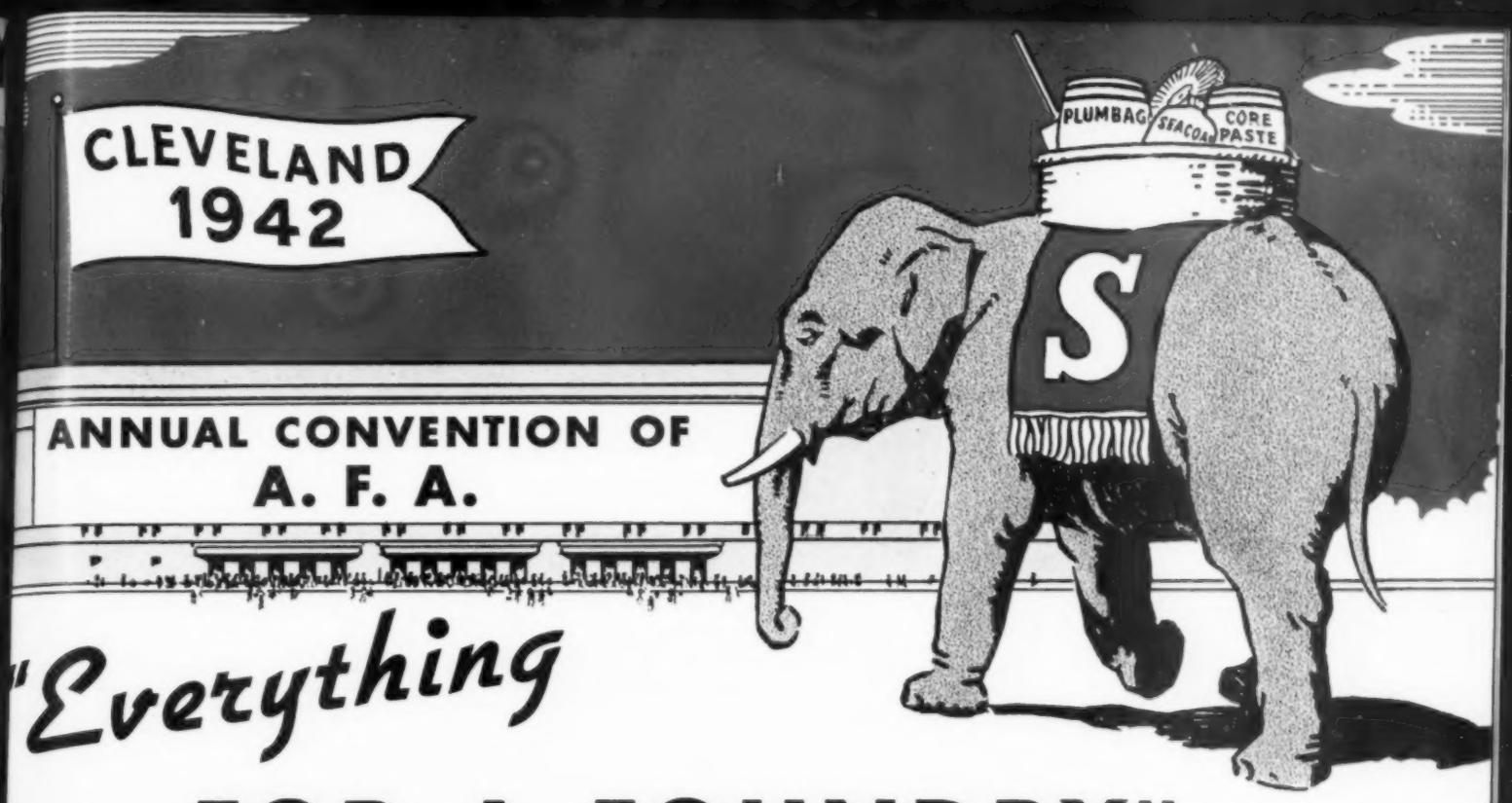

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- CANADA . . Frederic B. Stevens of Canada, Limited
- 1262 McDougall St. . . . . Windsor, Ontario
- 2368 Dundas St. West . . . . . Toronto, Ontario

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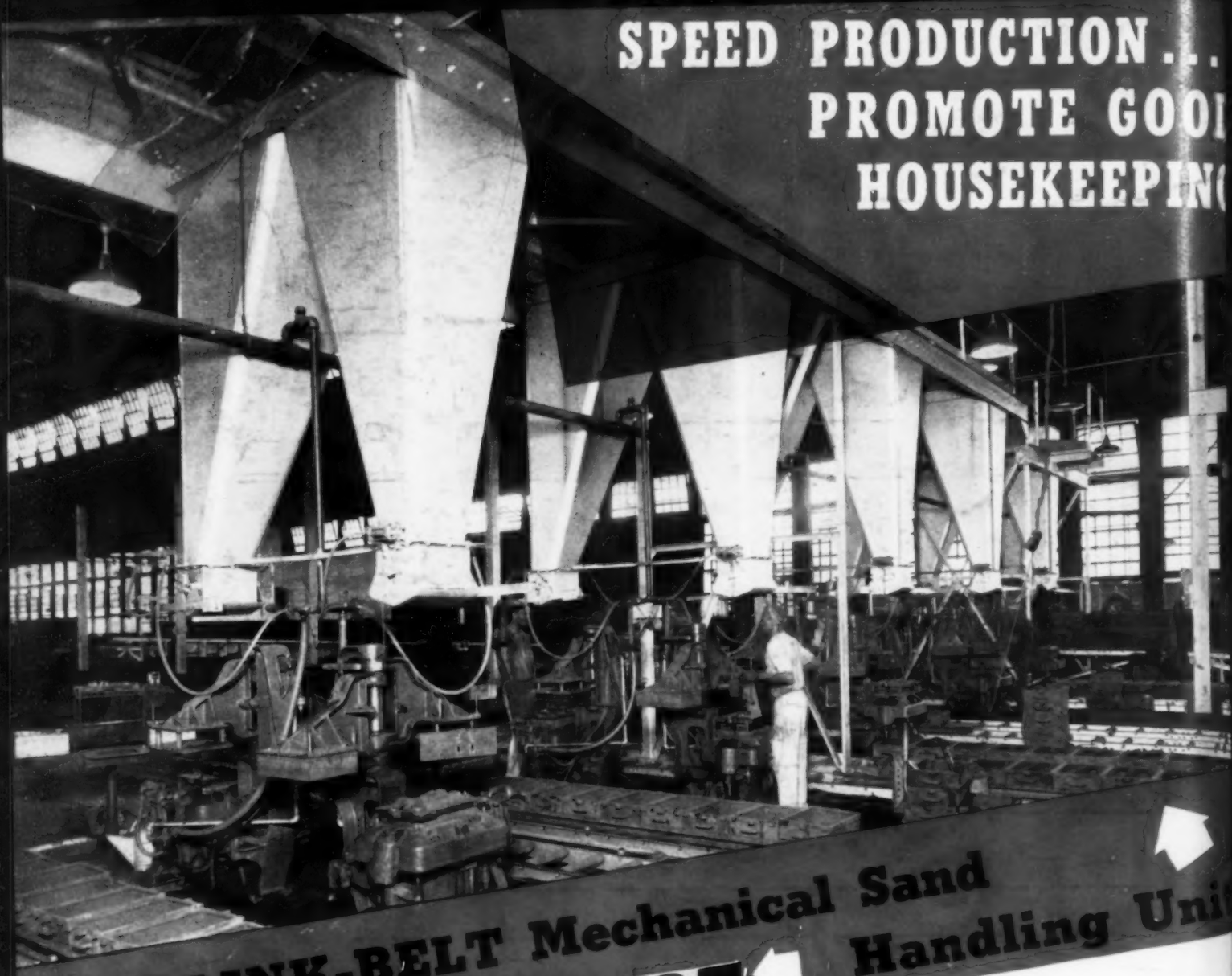

With LINK-BELT Mechanical Sand Handling Uni

Link-Belt distributing belt conveyors with single or double adjustable discharge scraper plows, deliver prepared sand to any number of molding stations in proper quantities. Molder's hoppers, gates and chutes are adaptable to different types of molding machines, and building clearances.

Link-Belt anti-friction belt conveyors, including both flat and troughing types, are for every service in the foundry, including specially treated belts for hot shakeout sand.

● A well engineered sand handling system wil not only relieve foundry congestion and mak scientific sand control possible, but will also en able almost any foundry to obtain greater produc tion at lower cost and make better castings. The Link-Belt system illustrated, delivers clean pre pared sand to molding machines, handles an stores molds through pouring and cooling to central shakeout, with flasks returned to moldi stations. It is simple, orderly, dependable a easily accessible. The workmen take pride in operation and high speed production.

Let our experienced foundry engineers help yo in applying correctly designed and easily adapte Link-Belt units to meet your individual condition

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Offices, warehouses and distributors in principal cities

LINK-BELT

EQUIPMENT for MATERIALS HANDLING - - SAND PREPARATI